Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

AVMA Convention—Philadelphia, August 18-21, 1958

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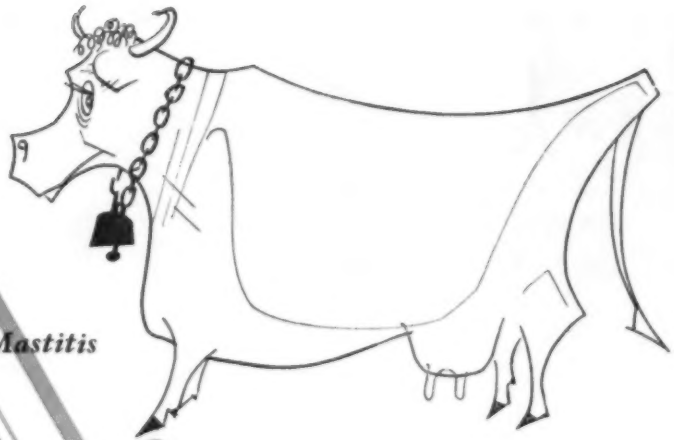

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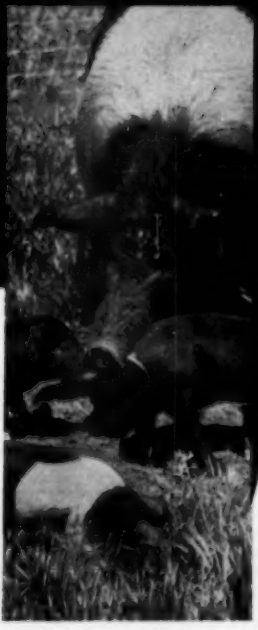

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Correspondence

March 27, 1958

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Could you also tell me how to set about advertising for a job?

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Yours faithfully,
s/PETER J. TURNER, Students Union, Victoria Rooms, Bristol 8, England.

{Replies may be directed to Mr. Taylor or sent via the AVMA office.—ED.}

• • •

April 5, 1958

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Send the JOURNAL by surface mail but if you wish to correspond with me, address me c/o Bareilly Club, Bareilly, U. P., India. If you send the letter airmail, I would get it in about five days.

Kindly give my greetings to the members of the staff and may all that is good be yours and theirs.

Sincerely yours,
s/I. D. WILSON, D.V.M., *Deputy Group Leader for Veterinarians.*

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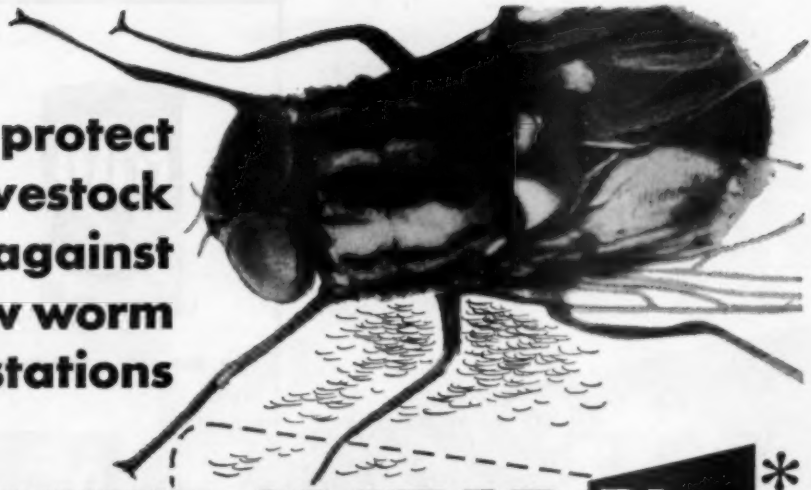

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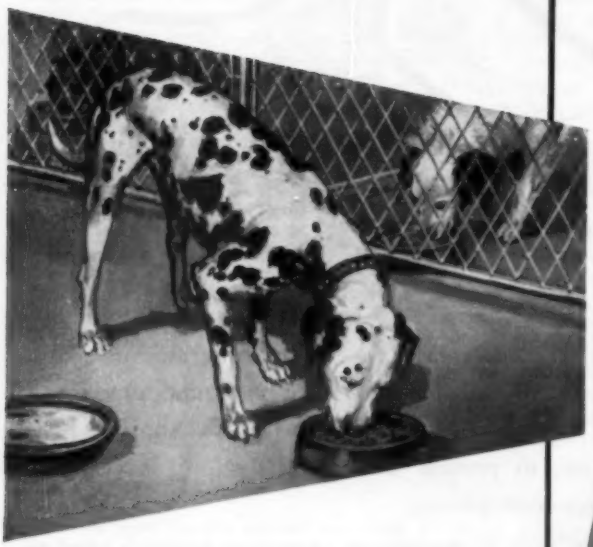

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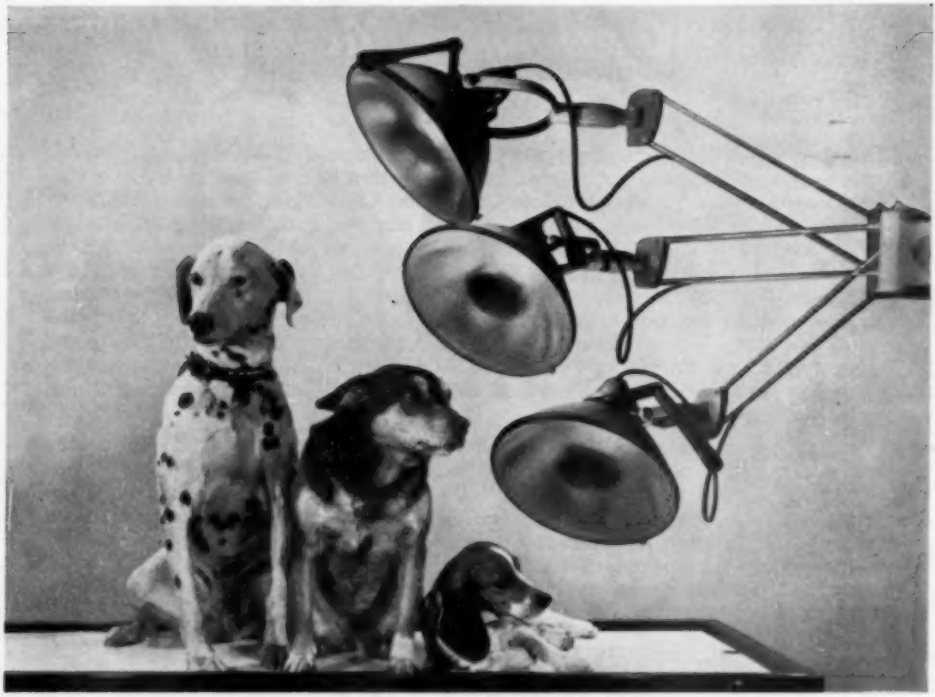

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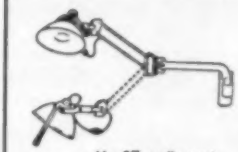

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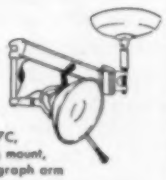

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Washington News

Legislative.—AVMA President Armistead, accompanied by Assistant Executive Secretary Kingman, appeared before the Health and Science Subcommittee, House Interstate and Foreign Commerce Committee, on bills relating to federal grants for construction of research and teaching facilities (H.R. 6874, 6875, 7841, 11913) in medical and dental schools and sciences related to health. Subcommittee Chairman Williams (D., Miss.) arranged for panel-type hearings, April 22 and 23, with medicine, dentistry, and veterinary medicine represented on the panel. Also joining the group as administration witnesses were Surgeon General Burney, P.H.S., and Dr. Aims McGuinness, special assistant to H.E.W. Secretary Folsom. Dr. Ward Darley, executive secretary, Association of American Medical Colleges, served as moderator of the panel-type hearings.

Dr. Armistead, who was complimented by Chairman Williams for his presentation and participation in the discussion, stated that, although the term "sciences related to health" in the Public Health Service Act has been interpreted to include veterinary medicine, he nevertheless recommended that the proposed legislation be amended to specifically include schools of veterinary medicine (see Business Sessions, Dec. 15, 1957, Part 2, JOURNAL); provide for an appointed member of the Advisory Council from the veterinary profession; and grant veterinary schools funds on an equitable basis.

Dr. Russell I. Thackery, executive secretary, American Association of Land-Grant Colleges and Universities, filed a statement with the subcommittee in behalf of the executive committee of that Association, supporting the inclusion of schools of veterinary medicine in the proposed legislation.

Senate passed, April 21, with committee amendments, H.R. 11767, fiscal 1959 U.S.D.A. appropriations (see JOURNAL, April 15, 1958, adv. p. 8). Amendments included the following for ARS: all research, $59,362,390 (increase $917,500); Plant, Animal Disease, and Pest Control, $47,132,000 (increase $5,400,000); Meat Inspection, $17,326,000 (increase $500,000 over fiscal 1958). The Senate concurred in the committee recommendation that funds for meat and poultry inspection NOT be consolidated and provided $7 million in A.M.S. funds for poultry inspection as proposed in the budget request.

Also recommended $20 million for brucellosis eradication (increase $5 million over House-passed bill and budget request). Senate insisted on its amendments and asked for conference with House. As of April 28, conferees had not met.

Senate Committee on Agriculture held hearings April 28 through May 1 on bills relating to humane slaughter of livestock (S.1213, 1497, and H.R. 8308).

Senate Subcommittee on Agricultural Research and General Legislation reported to full committee S.3076, authorizing transportation in U.S. of live foot-and-mouth disease virus for research purposes (see JOURNAL, Feb. 15, 1958, adv. p. 10).

The President, April 24, proposed to the Congress that Federal Civil Defense Administration be merged with the Office of Defense Mobilization in a new agency to be called Office of Defense and Civilian Mobilization. It is Reorganization Plan No. 1 of 1958. Senator Potter (R., Mich.), on April 25, introduced a resolution (S.297) that the Senate does not favor the Reorganization Plan. Either House of Congress can block the reorganization by adopting a motion of disapproval before July 1.

(Continued on adv. p. 28)

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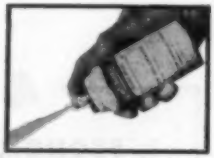

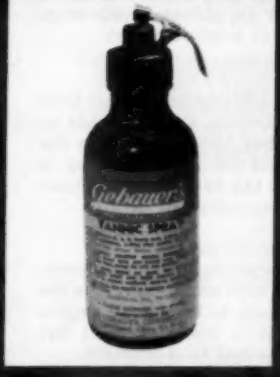

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Dosage: See CIBA Veterinary Therapeutic Index.

*Chambers, E. E.: N. Am. Vet. 37:105 (Feb.) 1956.

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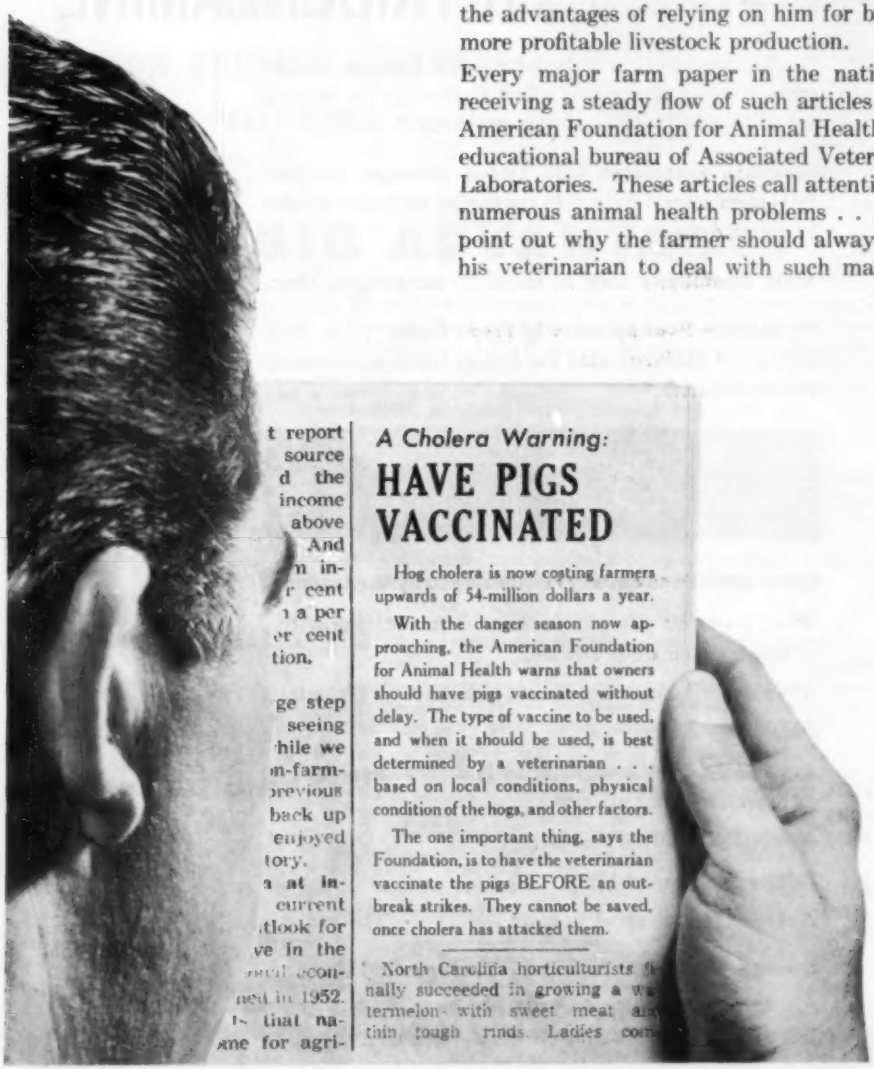

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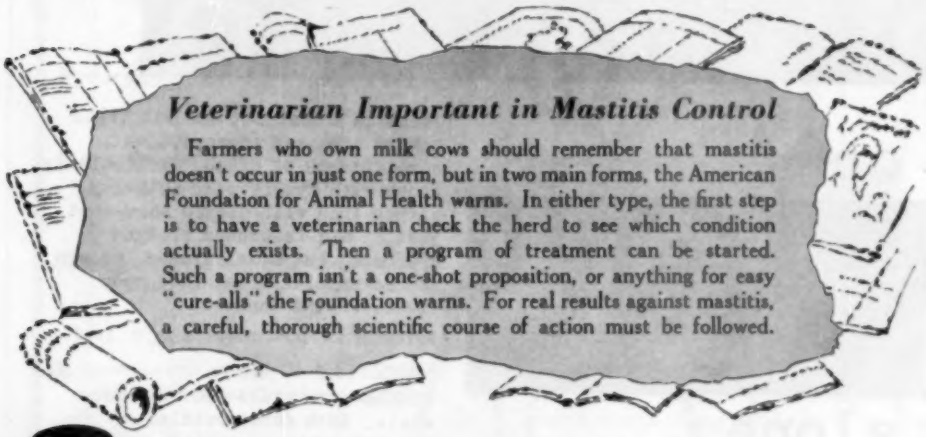

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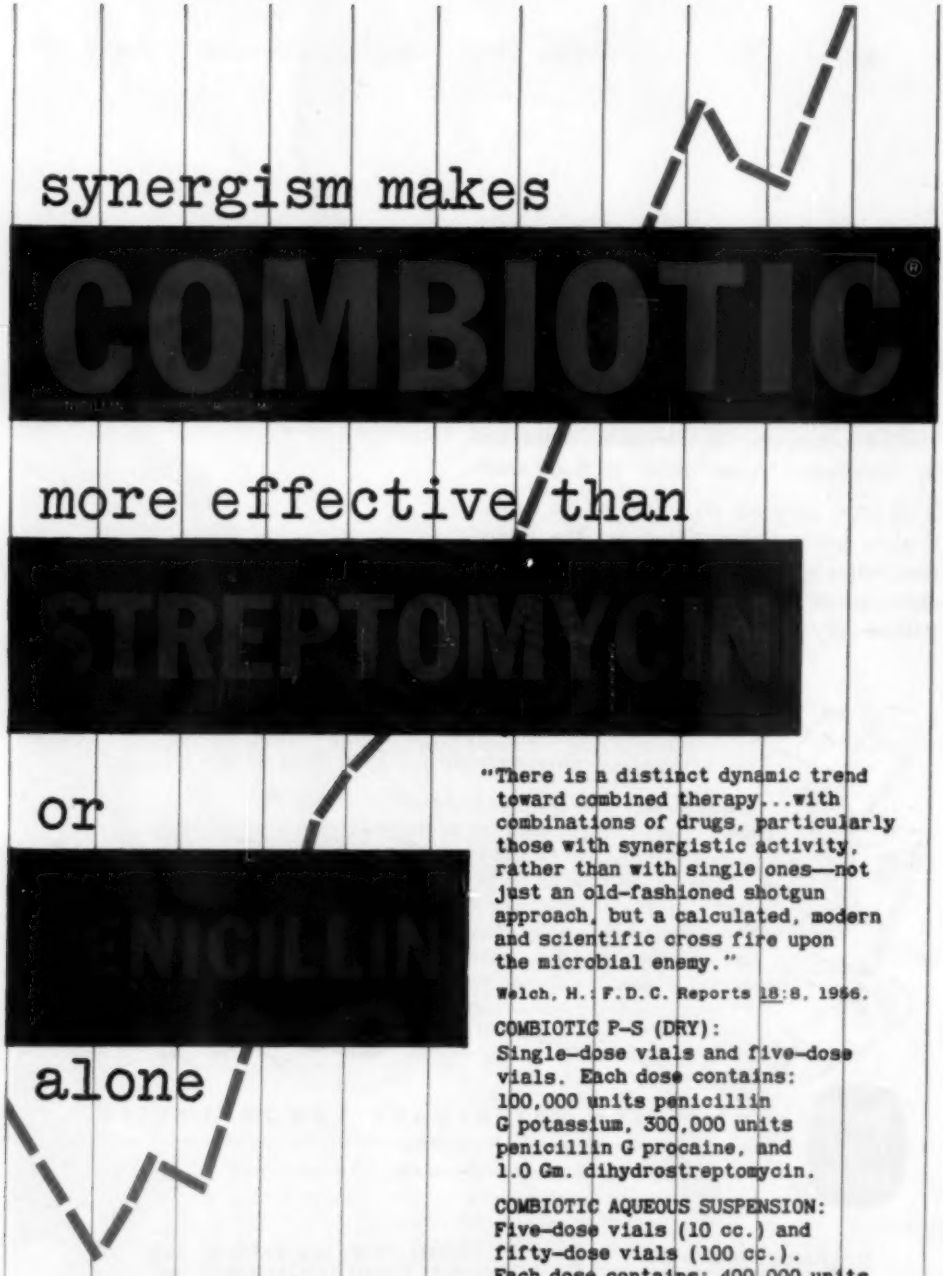

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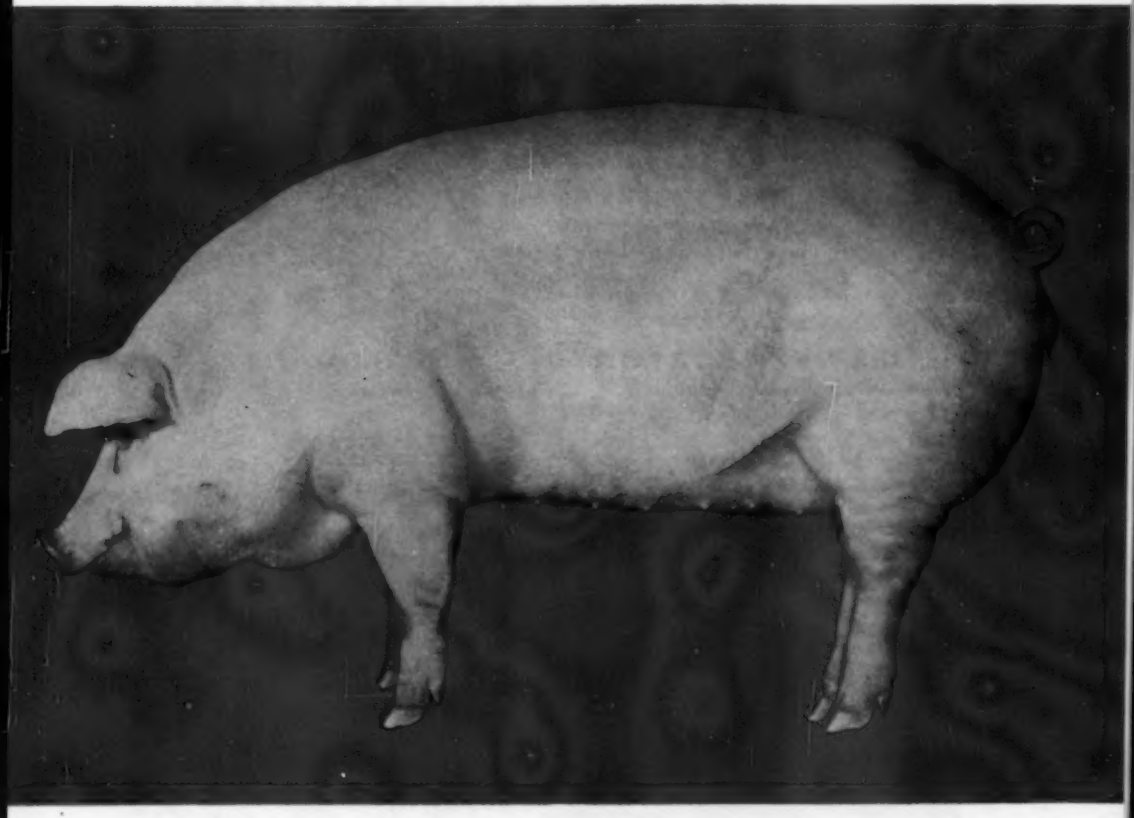

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The Carotid Body Tumor in Dogs

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Coral Gables, Florida

THE PURPOSE of this paper is to stimulate interest, particularly among veterinarians, in an infrequently reported neoplasm of dogs, *i.e.*, the carotid body tumor. This neoplasm appears in the neck in the vicinity of the branching of the common carotid artery.

The carotid body tumor is similar to the cardio-aortic body tumor in the mediastinum, sometimes referred to as "heart base tumor," which is quite familiar to most veterinary pathologists and clinicians. Although they arise in different locations, these two tumors bear a resemblance to each other histologically, and they both develop from a group of special cells of the "chemoreceptor" system.

While the nature of this system and its tumors will be described later, it can be pointed out now that, unlike the adrenal medulla and other members of the chromaffin system, the cells of these neoplasms do not give a true chromaffin reaction[14] (*i.e.*, the development of a brown color when the tissue is immersed in fixatives with chromium salts). In view of the questionable chromaffin reaction, the designation of these neoplasms as "chromaffin cell tumors," as they were formerly called, does not seem valid.

While the carotid body tumor is not a common lesion in man, more than 350 cases have been reported.[5] Recorded instances of carotid body tumor in the dog are rare. The authors of a recent textbook of veterinary pathology[24] mentioned that they had seen only one canine carotid body tumor. They listed this one lesion in a collection of 7,052 neoplasms of various animals, 5,315 of which belonged to the canine species. In necropsies on 14 dogs with tumors of the nonchromaffin paraganglia,[12] carotid body tumors were observed in 4 of the animals.

In one series of 2,300 necropsies on dogs, no carotid body tumors were found although, in the same group, there were 14 cardio-aortic body tumors.[21] Most of the latter were contributed to the Armed Forces Institute of Pathology and are included in the group of such cases reported in the veterinary pathology text[24] referred to previously, wherein one of them is well illustrated.

In the present report, there will be described a canine carotid body tumor which was successfully removed surgically. There will also be presented, briefly, a discussion of the carotid body and related structures, and of the neoplasms arising from them, particularly the carotid body tumor.

CASE REPORT

History and Treatment.—On May 14, 1957, a male Boston Terrier, 10 years old, was examined.* It had a history of difficulty in swallowing and occasional choking, of several months' duration. This dog had been treated for several years for a "chronic bronchitis and tricuspid valve disease," but no mass of the neck was identified during this time.

He was debilitated and a mass was palpated on the left side of the neck in the pharyngeal region. At surgery on May 20,

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The author is grateful to Jack O. Knowles, V.M.D., Knowles Animal Hospital, Miami, Fla., for the contribution of this case, and to William Atkinson, chief of the medical photography laboratory, Jackson Memorial Hospital, for the photomicrographs.

*Examined in the Knowles Animal Hospital, Miami, Fla.

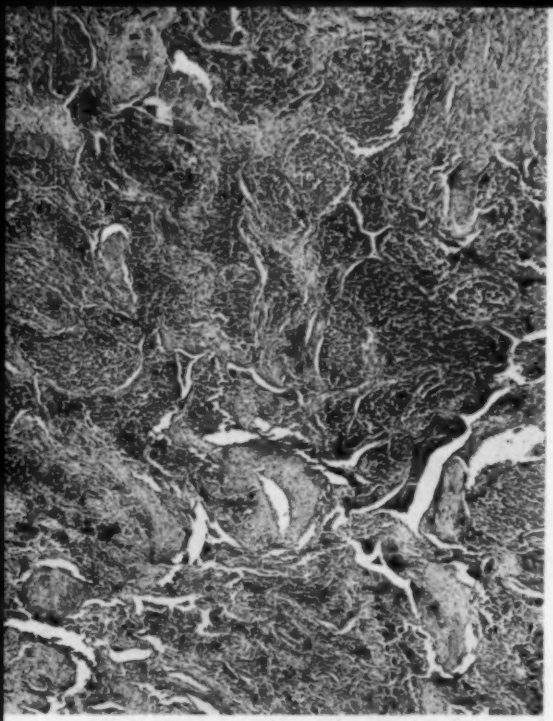

Fig. 1—Low power view of the carotid body tumor of a dog, showing nests of neoplastic cells separated by abundant fibrous stroma and prominent vascular channels. H & E stain; x 30.

a tumor was found attached to the arteries of the neck at approximately the area where the hypoglossal nerve crosses over the vessels. After dissection of the growth, which was apparently encapsulated, a small blood vessel was found adherent to the lesion. It was not determined whether this vessel arose from the occipital artery or from the external carotid, but it had to be ligated and severed in order to excise the neoplasm.

No complication resulted from this but, postoperatively, there was a lip drop which was sufficient to cause excessive flow of saliva. Atropine (1/150 gr. twice a day) was effective in controlling the excessive salivation. However, mepazine (Paxital†) (50 mg., twice daily) was found to be a gentler form of controlling the salivation, in addition to quieting the dog.

The cardiorespiratory signs of several years' duration persisted after the operation but the difficulty in swallowing was alleviated. When the patient was last ex-

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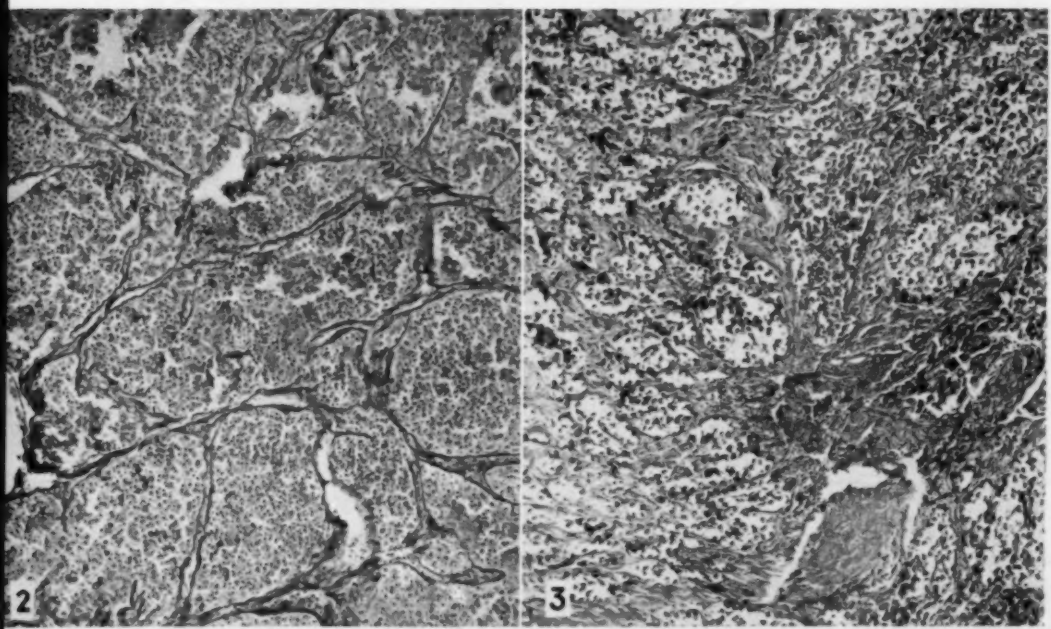

Fig. 2—Characteristic area of carotid body tumor of a dog—nests of small, endocrine-like cells outlined by reticulum. Vascular spaces between nests are demonstrated. Silver (reticulum) stain; x 84.
Fig. 3—Another area with nests of larger, clear cells separated by dense fibrous stroma. H & E stain; x 84.

amined, on October 15, no recurrence of the tumor was observed.

Despite successful removal of the tumor and apparent good progress postoperatively, the owner insisted that the dog be euthanatized because of the persistent cardiorespiratory condition. This was done without consulting the veterinarian and without necropsy.

Description of Tumor.—The specimen was a moderately firm, grayish white mass with brownish foci that measured approximately 3.5 by 3.0 by 2.5 cm. Microscopically, the tumor consisted of numerous alveolar-like masses of cells separated by a vascularized fibrous stroma (fig. 1-3). The vascular channels between the nests of cells were so abundant in some areas that the neoplasm had an angiomatous appearance. But in other places, the fibrous stroma was dense and hyalinized.

By means of a silver stain, abundant reticulum which outlined the nests of tumor cells was identified (fig. 2). The blood vessels between the neoplastic masses were well demonstrated by this silver stain.

The neoplastic cells throughout most of the lesion were small, generally round with very scanty cytoplasm, and endocrine-like in appearance (fig. 4). The nuclei had sharp membranes and delicate granular chromatin. Some of the nuclei were smaller and darker with compact chromatin.

In certain areas, the cells were larger and consisted of clear cytoplasm and nuclei which varied in size, shape, and staining quality (fig. 3, 5). Several large hyperchromatic nuclei were evident, but no mitotic figures were identified. In the periphery of the neoplasm, where there was an irregular fibrous capsule, masses of tumor cells were present in the lumina of some of the blood vessels (fig. 6).

DISCUSSION

The Chemoreceptor System.—There are certain structures, such as the carotid body, closely associated with major arteries and nerves, which are referred to as "chemoreceptors." This designation is given to them because they are stimulated by changes of the pH and of the oxygen and carbon dioxide composition of the blood, to produce respiratory reflexes. Cer-

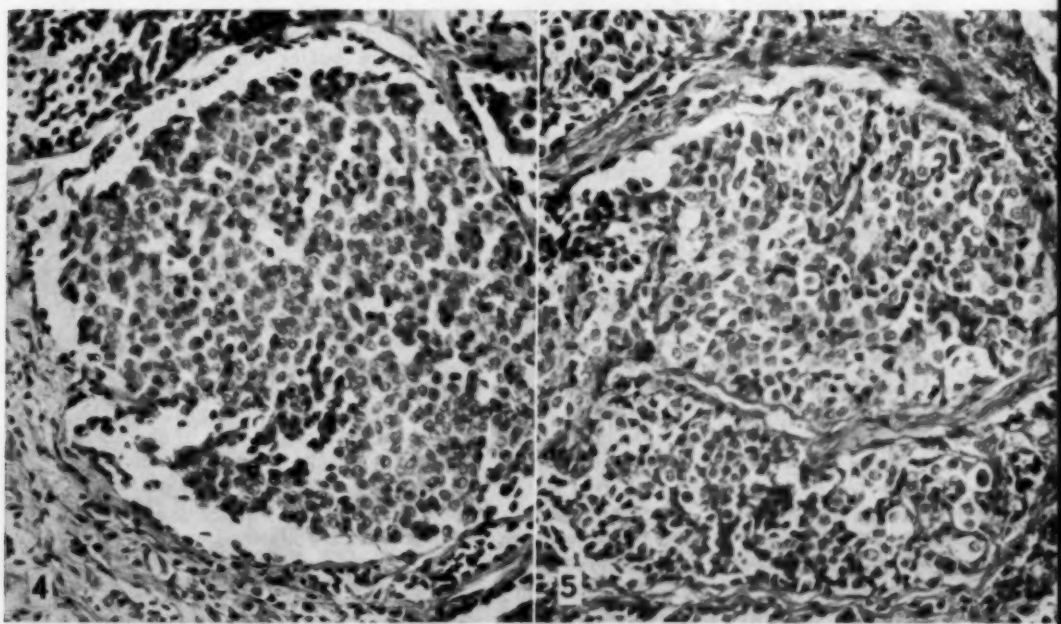

Fig. 4—High power details of rather uniform, small endocrine-like cells pictured in figure 2. H & E stain; x 247.

Fig. 5—High power details of area shown in figure 3. Cells have more and clearer cytoplasm and more variation of nuclei than those in figure 4. H & E stain; x 247.

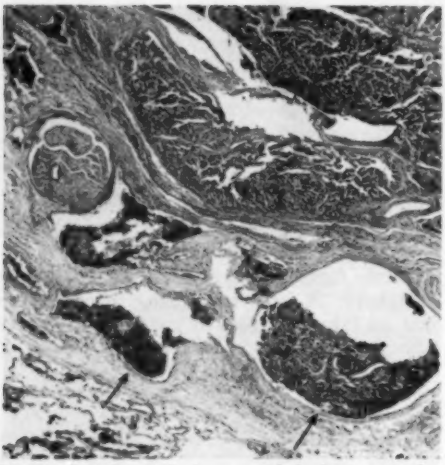

Fig. 6—Periphery of the carotid body tumor of a dog, with masses of neoplasm (arrows) in lumens of vascular channels in the capsule. H & E stain; x 25.

tain investigators feel that the chemoreceptor system plays a significant role in the control of respiration under all circumstances; others maintain that it comes into play as an accessory mechanism in emergencies, such as anoxemia and marked increases in carbon dioxide tension of the blood; and still others feel that the answer lies somewhere between these extreme viewpoints.[23]

In addition to the carotid body, other structures which are considered parts of the chemoreceptor system are: the aortic or cardio-aortic bodies, the glomus jugulare or paraganglion tympanicum, the group of cells associated with the ganglion nodosum of the vagus nerve, and the paraganglion ciliare (usually described in the monkey).

It has been established that the carotid and aortic bodies function as chemoreceptors and, although the function of the other bodies is not clearly known, they too are classified as members of this system because of the structural similarity to the carotid and cardio-aortic bodies.[14]

These structures, which do not secrete epinephrine, are sometimes referred to as the nonchromaffin paraganglia. They are to be differentiated from the epinephrine-producing, chromaffin tissues associated with the sympathetic nervous system, such as the adrenal medulla and organs of Zuckerkandl, and from the carotid and aortic sinus pressoreceptors.[14]

Location of Carotid and Cardio-Aortic Bodies.—In man, the carotid body is present in the neck in the vicinity of the bifurcation of the common carotid artery, lying on the medial aspect of this vessel, usually at the point where it branches into the internal and external carotid arteries.

In the dog, it is described as a reddish nodule attached to the medial surface of a very small branch which arises either from the occipital artery near its origin or from the external carotid artery.[4] The common carotid artery of the dog divides into three vessels at the level of the thyroid cartilage —namely, the occipital, the internal carotid, and the external carotid arteries.

The first two are much smaller than the external carotid, which appears to be the direct continuation of the common carotid. The occipital artery arises near the posterior border of the digastric muscle and crosses the internal carotid artery (which originates just behind the occipital artery), the cranial laryngeal branch of the vagus nerve, the ganglion nodosum of the vagus, and the cranial ganglion of the cervical sympathetic nerve.[2] It is crossed by the hypoglossal nerve. Nerve fibers from the carotid bodies can be traced to the glossopharyngeal nerve and to the sympathetic and vagus ganglia in the area.[23]

The cardio-aortic bodies are found in the base of the heart near the coronary arteries, in the vicinity of the aortic arch, between the aorta and pulmonary artery, and near the origins of the left and right subclavian arteries.[1,10]

Neoplasms of the Chemoreceptor System.—While the carotid body tumor is reported more frequently in man than in the dog, tumors of the aortic or cardio-aortic bodies are more common in the dog,[1,12,19,20,24] The latter neoplasms, found in the mediastinum in relation to the vessels arising from the base of the heart and representing one group of the so-called "heart base tumors" of dogs, are more familiar to the veterinarian than are the carotid body tumors.

Only a few instances of cardio-aortic body tumors have been reported in man.[6,13,15-17] Neoplasms of the other components of the chemoreceptor system are also known in man.[3,5,7,9,13,14,25] Next to the carotid body neoplasm, the tumor of the glomus jugulare, arising in or near the

middle ear, is the best known of this group. Even 2 cases interpreted as nonchromaffin paragangliomas of the cervical portion of the vagus nerve, inferior to the ganglion nodosum, have been observed.[11] The term "chemodectoma"[19] is often applied to these tumors.

Features of Carotid Body Tumor.—The carotid body tumor may be a firm or soft neoplasm which usually is bound to the arteries at the carotid bifurcation. In the present case, the lesion was situated at, or slightly distal to, the point of branching of the common carotid artery, in close relation to the occipital and external carotid arteries. The lesion is smooth or nodular, usually encapsulated, and up to 5 or 6 cm. in diameter.

Clinically it is a slowly growing "lump" or nodule in the neck, near the angle of the jaw. Occasionally, by pressure on adjacent structures, it may produce other clinical manifestations, such as the difficulty in swallowing and occasional choking in this dog.

Other clinical features of diagnostic significance are: free mobility of the mass sideward but little or no mobility in a cephalocaudal direction; decrease in size on compression of the common carotid artery; and transmitted pulsation. As for the latter feature, some say that the pulsation is not of the expansile type;[14] others indicate that it may be expansile.[18]

There is said to be no particular predilection of this tumor for either sex. It occurs in man, usually during the second, third, or fourth decade.

While the canine data are insufficient to show a definitive clinical correlation, the 4 cases described in the literature[12] and the present case were in male dogs, 8 to 12 years old (except for 1 dog which was only 2½ years old). Three were Boston Terriers, 1 was a Boxer, and 1 a Cocker Spaniel.

Concerning the cardio-aortic body (heart base) tumors in dogs, there seems to be no marked sex predilection although, of 52 cases described,[1,12,19,20] there was a slightly higher incidence in males (32:20). They ranged from 5 to 17 years old, and 25 were Boxers, 23 were Boston Terriers, with individual instances in other breeds.

In another report concerning 28 cases, the brachiocephalic breeds (Bulldog, Boston Terrier, Boxer) were said to be most commonly affected; but the sexes and ages were not given.[24]

Carotid body neoplasms are usually unilateral but, occasionally, bilateral tumors occur. In the canine cases,[12] there were bilateral carotid body tumors in 1 of the dogs, as well as two instances of coexistent cardio-aortic and carotid body tumors, and 1 case in which there were four discrete cardio-aortic body neoplasms.

Another feature of interest in this series was the coexistence of the chemoreceptor neoplasms with a nerve sheath tumor in 1 dog and with pheochromocytoma in 2 other dogs. In another report,[19] multiplicity of cardio-aortic body neoplasms was noticed in 2 of 5 dogs. In man, multiplicity of tumors of the chemoreceptor system has been observed in some cases.[5,13,18]

Malignancy of Carotid Body Tumor.—Generally, the carotid body tumor is characterized by a benign, prolonged, clinical course, but instances of recurrence following surgical removal of the tumor, and even of metastases, have been recorded.

The commonest malignant manifestation is local recurrence following excision and such recurrence usually proves fatal.[18] The incidence of malignancy as reported is somewhat variable—in one group of 129 cases of carotid body tumor, 21 (12%) developed recurrence or metastases[18] while, in another review, of 257 reported cases of carotid body tumor in man, metastases were present in 4 (1.5%) instances.[5] Metastases to lymph nodes and to more distant organs[3,13,14,22,25] have also been observed in other chemoreceptor tumors in man.

Usually, there is a lack of metastases in the canine cardio-aortic body tumors;[1,19,20,24] however, in the recent study of nonchromaffin paraganglioma in dogs,[12] metastases were recorded in 6 of 14 cases. In 3 of these, the animals had cardio-aortic body tumors only; in 2, there were coexistent cardio-aortic and carotid body neoplasms; and in 1, there was a large, vascular-invading, carotid body tumor on one side and a smaller one on the other side.

One can not rely upon histological criteria for a determination of the prognosis of the carotid body tumor. In clinically malignant tumors, histological evidence of malignancy is generally lacking. Variation in size and shape of nuclei is not uncommon, even in the clinically benign lesions. Mitoses are not common in this lesion, regardless of its clinical behavior.

Even the presence of tumor cells within blood vessels, as demonstrated in this case, is apparently not a definite criterion of malignancy.[14]

Management of Carotid Body Tumors.—In general, these tumors are nonresponsive to radiotherapy. The usual form of therapy that is employed is surgical excision. In a few instances, as in this case, careful dissection and simple excision of the growth may be accomplished without serious operative complications.

Because of the adherence of the tumor to the carotid artery in many cases, operative mortality is high;[14,18] and in those which survive, damage to the central nervous system, resulting from ligation of the artery, is a significant complication. In those cases in which surgery is deemed necessary, it is recommended that the carotid collateral circulation be investigated before excision is carried out.

In discussing the management of carotid body tumors, Monro[18] indicated: "It seems likely that an increasing respect for the integrity of the carotid vessels, combined with an increasing determination to define wherever possible the white line of cleavage in the adventitia described by Sir Gordon Gordon-Taylor (1940), will lead to the successful removal of an increasing number of carotid body tumors without interference with the carotid bifurcation."

However, when it is not possible to do a simple dissection with preservation of the carotid vessels, he refers to the use of ligation of vessels, if preoperative investigation has shown good collateral circulation, and anastomosis by vein graft of the common and internal carotid arterial stumps when the investigation has disclosed inadequate collateral circulation. The use of anticoagulants has been suggested to minimize arterial thrombosis when ligation and excision are necessary.

Before the operation is undertaken, it is essential that the diagnosis be established. This is done by means of a careful biopsy after adequate exposure and inspection of the lesion. Needle or punch biopsy through the skin is not advocated because this may be made difficult by a lesion which is tough and fibrous, or because there may be risk of hemorrhage in those neoplasms which are vascular or in cases where the possibility of aneurysm has not been excluded.[14,18] The diagnosis of malignancy by frozen section, although approved by some, may not be possible because of the nature of the tumor.[14]

SUMMARY

A canine carotid body tumor which was removed successfully at operation is described. Also presented is a brief discussion of the chemoreceptor system and of certain clinical and pathological features of neoplasms of this system in man and in dogs, with particular emphasis on the carotid body tumor.

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Last Step in Blood Clotting Found

Blood clotting is a complex series of biochemical steps, each dependent upon a previous one, the last being the action of thrombin on fibrinogen to form fibrin.

It has been found that thrombin acts on fibrinogen by rearranging the electric charges on the bonds of each molecule so that they clump togeter as fibrin to from a clot. Three other enzymes similar to thrombin also break down protein molecules by splitting the peptide bonds which hold them together.—*Sci. News Letter (March 22, 1958): 181.*

Lymphotrophic Antibiotics

Most antibiotics are crystalloid molecules and are primarily circulated through vascular routes with little concentration in lymph and lymph nodes. Conversely, macromolecules and colloidal particles have a particular affinity for the lymphatic system. Therefore, several antibiotics have been combined with high molecular compounds (they are called antibiolymphins) and their pharmacological properties were studied. Their physiological behavior was between those of a pure crystalloid and a pure colloid.

When streptomycin or neomycin was injected into peripheral lymph vessels in the hind extremity of a dog, 70 per cent appeared in the thoracic duct within four hours whereas, when streptolymphin or neolymphin was likewise injected, only 20 per cent was collected from the thoracic duct in four hours.

After intramuscular injection, there was only a low concentration of streptomycin in the regional lymph nodes and it disappeared after the fourth hour; when streptolymphin was injected, concentrations were higher and continued for 72 hours or more. Similar results were obtained with sternal and mediastinal lymph nodes after intrapleural injections. Neomycin disappeared from the pleural cavity after four hours while neolymphin was present after 48 to 72 hours.

The acute toxicity of the antibiolymphins was much less than of the antibiotics. —*Nature (March 8, 1958): 706.*

A Theory of Antibody Formation

Cells common to the reticuloendothelial, lymphoid, and hematopoietic systems are involved in antibody formation but the precise cellular mechanisms are unknown. The site of antibody production varies with the manner in which the antigen was introduced into the host. It has been reported in the spleen, regional lymph nodes, bone marrow, thymus, omentum, skin, muscle, and fat.

Two steps are involved: (1) a reaction of certain cells with antigen, bringing about specific enzymatic changes; and (2) utilization of the specific enzymes, in the lymphoid or reticuloendothelial tissues, for the synthesis of antibody. These two steps may occur in different cells.

Experiments indicate that eosinophils are involved. If the host has been previously exposed to the antigen there is a specific eosinophil response at the site of injection and in the region of antigen fixation. Presumably, the eosinophils are chemotactically attracted to the antigen and react with it, producing specific enzymatic changes on or within the cell. The eosinophils are then phagocytized by reticuloendothelial cells and the specific enzyme in eosinophils is utilized to form antibody.

This hypothesis would explain why reticuloendothelial cells are capable of continuing antibody production *in vitro* but are incapable of initiating it.—*Nature (March 8, 1958): 681.*

A Note on the History of Horsepox

CLIFFORD H. EBY, D.V.M.

Pullman, Washington

FOR MANY CENTURIES, pox in its various forms has been described by numerous chroniclers. The disease often occurred in epizootic form, bringing heavy losses and much deprivation. However, it was not until the late eighteenth and nineteenth centuries that the disease took on specific interest for both human and animal medicine. Although the country folk had for centuries recognized pox in a number of animal species and also realized its value in immunization against various types of pox, scientists had paid little attention to the condition.

The unfortunate choice of nomenclature applied by Edward Jenner, an English physician, to the pox of the equine species, started one of the greatest controversies known to veterinary medicine and, as such, his writings were a great disservice to the veterinary profession. They confused a known disease and effectively retarded complete understanding of that disease for many years. The argumentative fire burned for many years over Europe, England, and parts of Asia. Conclusive research was done during World War I, yet there is not full agreement on nomenclature even today. Had Edward Jenner been more familiar with veterinary medicine of his time, or had he taken the trouble to collaborate with veterinarians concerning the disease, the controversy might never have taken place.

Veterinarians of the time (as those of today) recognized a condition of horses' heels and fetlocks, caused by filth or injury, and applied to it the term "grease" (dermatitis varrucosa).[3] Jenner unwittingly applied this name "grease" to his observations of horsepox (variola equinae), even though the two conditions were well recognized and distinguished, as ancient writers had described horsepox centuries before. His mistake in nomenclature started a disagreement which encompassed many of the great names in veterinary medicine. Among those embroiled were such men as Bouley, Lafosse, Chauveau, Nocard, Leclainche, Dieckerhoff, DeJong, and many others.

It appears that French veterinarians were the first to take exception to Jenner's poor choice of terminology. The term "eaux-aux-jambes," somewhat synonymous with the English term "grease," was applied vulgarly to conditions of the heels and fetlocks of the horse, but it was not specific for horsepox.[1]

Had Jenner given a complete description of equine variola instead of describing it only as an inflammation and swelling of the heel, or as "sore heels" and "diseased heels," much confusion could have been averted and an ambiguous disease made specific.

As the dissension continued, many prominent investigators clearly separated equine variola (Jenner's grease) from the commonly known grease heel. As early as 1830, Hertwig clearly described horsepox and pointed out its transmission to man. Lafosse, working at Toulouse, described a distinct case of equine variola in which pustules were also observed on the head. Inoculum from the horse infected both cattle and man. Again in 1865, Lafosse observed that the disease could be demonstrated on parts of the body other than the feet and legs.

Bouley described lesions on the mucous membranes as early as 1843. In 1866, his classical description pointed out that the disease could manifest itself on either mucous membrane or the skin. He is given credit for changing the term of Jenner's "grease" to horsepox, thus taking the disease away from the realm of the feet and limbs exclusively.[1] Horsepox could now be classed as a specific entity along with other pox diseases.

With the disease clinically described and to some extent understood, the controversy swept into its second phase—a controversy concerning the true nature of the disease, as some workers denied its very existence.

That the disease was transmissible to other animals and man seemed quite firmly established. In 1802, a contemporary of Jenner had passed Jenner's "grease" from horse to cow and from both cow and horse

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to man. Lafosse also had passed the disease to man and cattle, while Hertwig had reported its transmission to man.[1]

The method of transmission in a stable was by the hands of horseshoers or grooms and by other vehicles including brushes, bandages, and the litter. When the horse licked the affected parts of the limb, the disease was passed to its mouth and nostrils. Thus, transmission was from horse to man and vice versa, as well as between horses and other species. By 1866, true horsepox (Jenner's grease), as distinguished from grease (dermatitis verrucosa), was well established in the French and English literature.

In Germany, however, agreement on nomenclature was lacking. The fever and the eruptions on the mucous membranes, along with the other classical signs, had all been described. However, as time passed, descriptions omitted its vaccinal nature. Transmission experiments by many observers, although successful, were considered of little significance. Thus, in German literature, the disease degenerated to a point of being considered only a nonspecific contagious stomatitis. Finally, a point was reached where Dieckerhoff stated that all the material written over the past years concerning equine variola (Jenner's grease) had no foundation in fact.

The German view held that the French horsepox (Jenner's grease) was nonexistent and that what they had been describing was, in reality, simply a contagious pustular stomatitis. The only concession allowed by the German researchers, from their transmission experiments, was that the disease did appear as a dermatitis as well as in the stomatitis form. The so-called English "equine variola" (Jenner's grease) was considered an infection caused by Bacillus organisms and, therefore, distinct from the nonexistent horse pox.

As a consequence of all these writings, the disease was known for many years under a myriad of names such as pustular dermatitis and contagious pustular stomatitis—terms still used today by some authors.[8] The German term *Schutzmauke*, which alluded to its protective properties against smallpox, was derided by Dieckerhoff and Grawitz.[1]

That men of the times were skillful and reputable investigators is not denied; however, one wonders at the narrow scope of imagination shown by the veterinary profession in its researches. It is revealing when we consider Sir William Osler's statement that, "The weight of evidence favors the view that cow pox and horse pox are variola modified by transmission."[7] The Hungarian writers Hutyra and Marek, at an even later date (1912), still hesitantly admit the existence of horsepox. They state that, "The descriptions, however, do not reveal a sufficiently clear conception regarding the true nature of the affection observed."[4]

In the United States at the turn of this century, the two primary diseases seem to have been well described. The U.S.D.A. (BAI) report, "Diseases of the Horse" (1903), states under the heading of "grease" that it is a specific affection of the heels of horses and is to be distinguished from horsepox. In the same publication under the heading "Horse Pox," or "Equine Variola," we read:

> Horse pox is specific infectious fever of the horse attended by an eruption of pustules, or pocks, over any part of the skin or on the mucous membranes lining the various cavities in the body, but chiefly and often exclusively, upon the pasterns and fetlocks. This disease was described by early Roman agricultural writers and by the veterinarians of the last century. It received its first important notice from the great Jenner, who confounded it with grease in horses, since animals with this disease are very apt to have the eruption of variola appear on the fetlocks.[5]

James Law,[6] in his text of 1906, states under the heading "Horse Pox, Variola Equinae," that "This was recognized toward the end of the eighteenth century in the valley of the Severn, England, by Jenner, who believed it to be the origin of cow pox, but failed apparently to distinguish it from ordinary 'grease'."

Most modern authors appear sufficiently satisfied to distinguish horsepox (Jenner's grease) as distinctly different from grease heel (dermatitis verrucosa). In the 1949 edition of Hutyra and Marek, the editor comments that, "The condition known as grease, greasy leg, seborrhosa, which represents a chronic dermatitis affecting particularly the fetlock and pastern region, has no relationship with equine variola."[3] Much work has been done in recent years on the pox virus and the reader is referred to Downie and Dumbell[2] for a survey of this work, which includes electron microscope findings.

From an historical point of view, Jen-

ner's misnomer, and the subsequent disagreements that followed, point up quite clearly the need for the close correlation of all branches of medical science.

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Prophylaxis Against Tetanus.—Clinical tetanus may develop in patients (man) who have been given 1,500 units of tetanus antitoxin at the time of injury. Neither the morbidity nor mortality seems to be lessened by this so-called "prophylactic" dosage. (Immediate or delayed anaphylactoid reaction to this foreign serum may result in death.) For adequate protection, man should be given 40,000 to 100,000 units.

Persons with an active immunity from the previous use of tetanus toxoid should be given single booster doses at 5- to 8-year intervals.—*Am. J. Surg. (April, 1958): 664.*

More Viruses Isolated.—Control of the common respiratory diseases in man depends on the determination of their causative factors. Two new viruses biologically related to influenza and mumps, yet quite distinct, have recently been isolated from children during epidemics of febrile respiratory illness. At least 70 other viral agents have been similarly isolated since 1954.—*Pub. Health Rep. (March, 1958): 193.*

Veterinary Radiology Facilities at Washington State College

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In planning the x-ray facilities at the Washington State College veterinary clinic, the first concern was safety from x-radiation (especially during therapy) and from electric shock. This includes safety of the radiologist, his assistants, the animal patients, and all others who may be in the vicinity. For convenience, the equipment for both large and small animals was centrally located in rooms used exclusively for radiology. The x-ray units had to be movable so that they could be operated from almost any location in the room. Finally, attention had to be given to restraint for all types and sizes of animals.*

The radiology unit, when completed, will occupy floor space 36 ft. 8½ in. by 35 ft. 6 in. and will consist of five rooms: the x-ray room, the control room, the film processing room, the viewing room, and the radiology office (fig. 1).

The area now completed consists of the x-ray and control rooms with floor space 36 ft. 8½ in. by 22 ft. 10 in. Inside measurements of the x-ray room are 23 ft. by 21 ft. and the main exit is 5 ft. wide and 7 ft. high. The exit into the control room is 3 ft. wide and 7 ft. high, and the exit into the proposed viewing room is 2 ft. 6 in. wide and 7 ft. high. Each exit is closed with a heavy sliding door lined with 8.2 mm. of lead. Each door, when closed, overlaps 6 in. on either side and 6 in. at the top. Lead thresholds 8.2 mm. thick, designed to arrest the radiation, are embedded in floor concrete at each exit. The width of the lead thresholds is the same at the respective doors, extending 12 inches beyond either side of the doors. The inside portion of each threshold extends 12 inches beyond either side of the exit openings.

There are two viewing windows of five thicknesses of leaded glass, equivalent to 8.2 mm. of lead, 24 in. by 16 in., surrounded

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*It is recommended that anyone contemplating construction of radiology facilities should refer to the "Planning Guide for Radiologic Installation," by Wendell G. Scott, M.D., et al., Yearbook Publishers, Chicago, Ill., 1953.

by 2.5 in. of solid lead sheeting. These are located so the x-ray operator may observe the patient while it is being treated. A "pass box," for cassettes and films, 22 5/8 in. by 24 7/16 in., through which films can be passed when the processing room is built, is located 3 ft. 6 in. from the floor.

To aid in making the floor of the x-ray room skid-proof, wet Alundum (carborundum) aggregate was sprinkled (¼ lb./sq. ft.) on the wet concrete floor which was float-finished without completely covering the Alundum.

The three sliding doors of the x-ray room are equipped with circuit-breaking switches, so placed that the circuit in the therapy unit is shut off and the operation of the machine halted if the doors are not closed or are inadvertently opened while this unit is functioning. In addition, a circuit-wired red light is installed on the outside wall over each door and is lighted to signal danger during the time the therapy unit is in operation.

The x-ray room is equipped with a therapy unit and a large x-ray diagnostic unit (fig. 2, I). The therapy unit head (General Electric Maximar 250 III) is mounted on an industrial type, electrically operated jib crane. This jib crane mount rotates in a 12-ft. arc which allows it to reach a patient in various parts of the room. The equipment is oil-cooled and is capable of operating from 80 to 250 kv. and 15 ma. continuously. The therapy head is fitted with a Regato Visual localized model 2M250 and has a lead shutter and light that aids in limiting and locating the size of the area

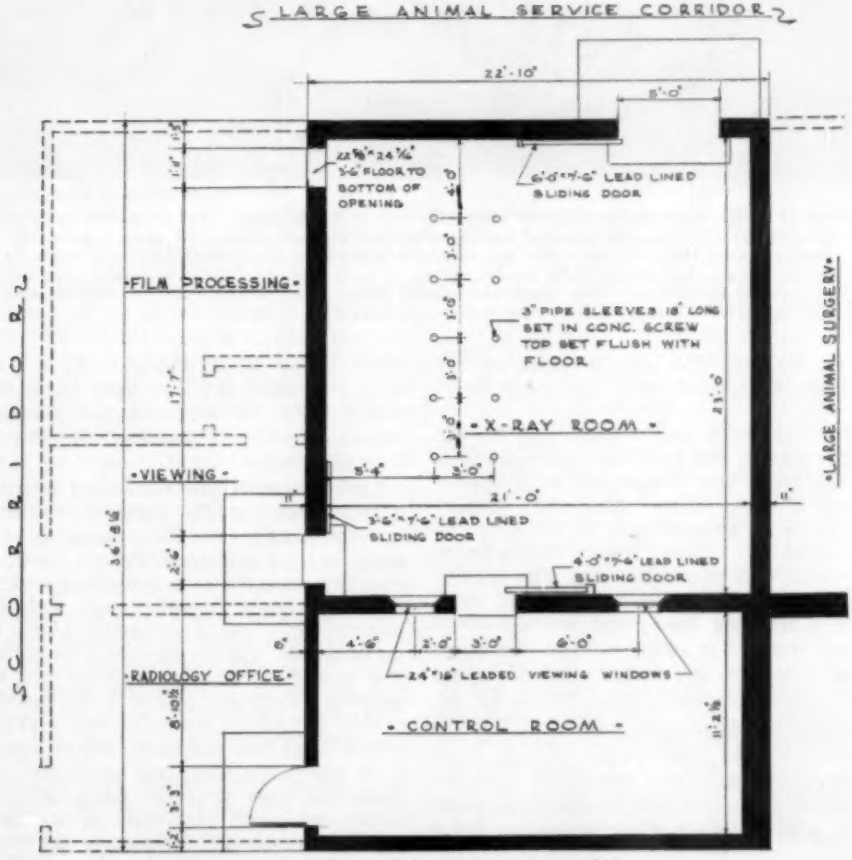
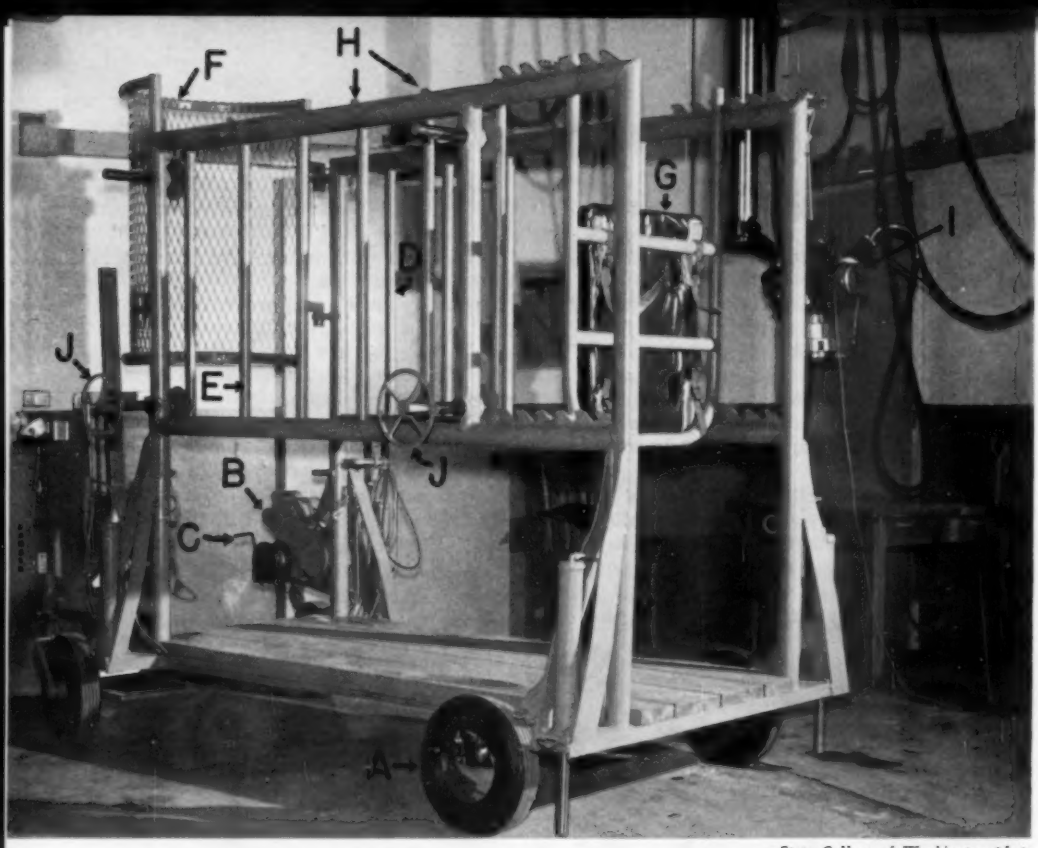


Fig. 1—Floor plan of the radiology unit, consisting of five rooms.



—*State College of Washington photo*

Fig. 2—Stock on wheels for mobility: pneumatic tires on 8-inch wheels (A); electrically operated hydraulic lift (B); manually operated crank-type wrench (C); side panel (D); squeeze panel (E); removable head stall (F); removable and adjustable end closure (back stop) (G); loop hooks for fastening chains for canvas "belly bands" to top of stock (left side) (H); diagnostic x-ray unit (I); squeeze panel 9-inch wheel cranks on threaded shafts; notice bicycle chains connecting upper and lower cog wheels (J).

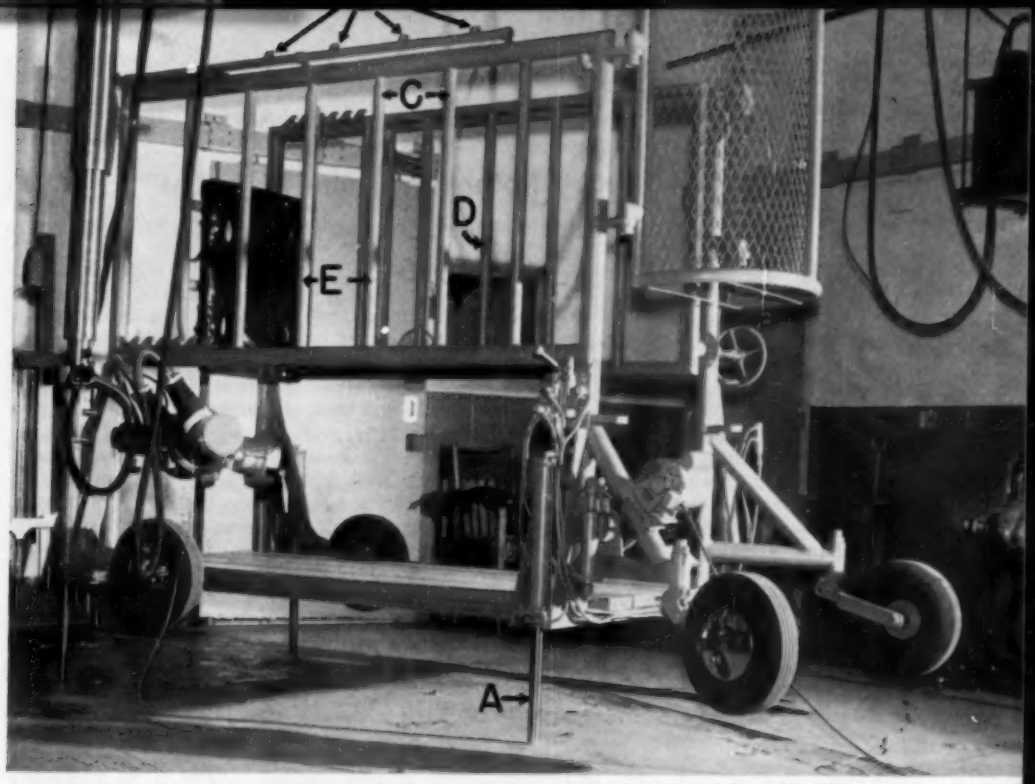
to be treated. The unit is designed for medium, superficial, and deep x-ray therapy.

The diagnostic unit** located on the opposite side of the room is suspended by a ceiling track and is mounted on a special electrically operated telescopic support which covers an area 9 ft. by 13 ft. It can be raised and lowered from 6 inches above the floor to a height of 13 ft. The head is equipped with a Super-Dyanamax tube with a rotating anode and has a kilovolt range from 30 to 150, a milliampere range from 5 to 500, and a time exposure speed to 1/120 of a second. Also, it has an adjustable diaphragmatic cone and a light beam centering indicator.

Small animals are positioned and restrained on a wooden kitchen-type table with a 32- by 42-inch top which has had a space 16 by 20 in. cut out and a 2-mm. aluminum sheet (to filter out x rays) fitted into it and, for standing radiographs, a human type upright cassette holder has been installed.

Large animals are restrained either by a removable, gatelike stock, supported by uprights sunk into floor sockets, 18 in. deep, or by a portable hydraulic stock. The floor-attached stock is actually a walkway 6 ft. long and 3 ft. wide, made with three upright pipes and a horizontal 1-inch pipe on each side. The 3-inch steel pipe uprights are placed in any consecutive six floor sockets which are placed 3 ft. apart on center (fig. 1). The 7-ft. 6-in. uprights, which drop into the floor sockets and rise 6 ft. above the floor, are perforated 3 ft. from the floor by holes large enough to admit the 1-inch pipe rails. When the uprights are removed, the sockets are covered by brass screw caps.

**Standard X-ray Co., Chicago, Ill.



—State College of Washington photo

Fig. 3—Stock raised on hydraulic lift: electrically operated hydraulic lift stock approximately 1 ft. above floor (A); loop hooks for fastening chains for canvas "belly bands" to top of stock (right side)—these bands are tightened by rotation of the loop-hook shaft with a ratchet (B); side panel (C); squeeze panel (D); removable pipes (E).

The mobile hydraulic stock (fig. 2) is mounted on 8-inch wheels with pneumatic tires.† To use the diagnostic, and especially the therapy x-ray, units, it is often necessary to raise the animal 12 inches above the floor. This stock can be lowered to the floor, to allow animals to walk into it, then it can be raised to any height up to 12 inches by four hydraulic lifts (fig. 3). The stock is 7 ft. 5 in. long and 2 ft. 9 in. wide. The side panel is 3 ft. 5 in. high, starting 2 ft. 9 in. from the floor, making the height of the side 6 ft. 2 in. The stock has a squeeze panel 5 ft. 1½ in. long and 3 ft. 5 in. high which is manually operated by a wheel crank at each end (fig. 2, J), which turns the threaded shafts at the top and bottom by means of a bicycle-like chain connecting the top and bottom cog wheels.‡

There are two removable head stalls for the front of the stock to hold the feed box, 1 ft. 6 in. deep, 3 ft. 6 in. high, and 2 ft. 7 in. wide; one is constructed of nonreflecting (dull) metal and the other of heavy screen. The removable end (back stop) is constructed of 1½-inch pipe, 3 ft. 6 in. high, 2 ft. 7 in. wide. There are three canvas back bands, 6 inches wide, with straps and buckles to be fastened to the top and sides of the stocks, and four canvas belly bands, 8 inches wide, with metal loops and chains to be fastened to the top of the left side of the stocks and tightened simultaneously by a wench-type tightener on the right side of the stock.

The control room houses the control panels for both the diagnostic and therapeutic radiology units, and some 25 armchairs are provided for the students to use during the radiology laboratory lectures.

A film badge and dosimeters are worn by the radiologist and those who aid him to test the amount of radiation that strikes them.

†This stock is an adaptation of the one built at the University of California School of Veterinary Medicine, Davis.

‡Hydraulic stocks constructed by Bill's Welding, Pullman, Wash.

Surgery and Obstetrics
and Problems of Breeding

Relief of Urinary Retention in the Male Cat

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IN FELINE PRACTICE, there is seldom anything easier to recognize than urine retention in the male. Signs of straining and palpation of a tense, greatly distended urinary bladder filling the posterior portion of the abdomen usually clinches the diagnosis. But from there on, successful handling is not easy. Attempts are made to (1) give immediate relief, (2) open the urethra to allow normal urination, (3) diagnose and treat the infection in the urinary tract, and (4) prevent recurrence of the retention.

Immediate relief is often a necessity because the cat may have voided only small amounts of urine for several days and, because of uremia, a delay of a few hours might be fatal. Expelling the urine is often a difficult problem. In a few cases, the plug of sandy, putty-like mucus can be quickly expelled by putting pressure on the bladder with one hand and extending the penis and rolling it between the forefinger and thumb of the other hand. Unfortunately, some plugs have been compressed until they are so hard that they can be removed only by radical surgery.

To give immediate relief, we formerly withdrew urine from the bladder with a 22-gauge hypodermic needle passed through the abdominal wall into the bladder. This seemed to cause little trouble even if a small amount of infected urine seeped into the abdomen from the needle puncture. We counted on penicillin or streptomycin to control the infection. However, in recent years, we find that these antibiotics have failed to prevent death from peritonitis in some cats. Why? In some cases, sensitivity plate cultures have shown that the bacteria in the infected urine are partially resistant to most antibiotics, and resistant to penicillin and streptomycin.

Since some of these cats have never had any medication, we are wondering if there could be enough of these antibiotics in cows' milk, which is still a staple item in a cat's diet, to produce resistance. This is assuming that some cows in the average dairy herd have been indiscriminately treated for mastitis with the popular types of antibiotics, and that the post-treatment milk was not discarded according to instructions.

Human beings, as well as animals, could carry pathogenic bacteria that are resistant to the common antibiotics, even though they may never have been treated with these antibiotics, because of those ingested with dairy products or other treated foods. These are not my observations. They have been quoted freely by laboratory workers who report that bacterial resistance to an antibiotic is more or less in direct ratio to the incidence of a particular antibiotic in foods normally consumed.[1] Penicillin and streptomycin are at the top of the list, with the others trailing. Chloromycetin and furadantin, drugs that have had limited use, are still about 80 per cent effective. But the regrettable part is that chloromycetin, although the most useful antibiotic today, still is not as effective as streptomycetin was five years ago.

CORRECTION OF DISTENDED UROCYST

To get back to the cat with the distended urocyst, there are three choices of action: (1) forceful catheterization, (2) laparotomy and cystotomy with sterile technique, or (3) stand there and wait until he dies of uremic poisoning.

In our hands, forceful catheterization has permanently damaged the urethra of many cats, although we use it successfully sometimes. Radical surgery, consisting of laparotomy and cystotomy, is often the best method because it rids the bladder of sand and mucus that may plug the urethra again in a few days or a week.

Surgical Correction.—For radical surgery, the cat is prepared, anesthetized, and tied on a table tilted so the tail is lower than the head. The abdomen is opened at the midline, over the bladder which is drawn out as far as possible through the

Dr. Fishler is a small animal practitioner in Elkhart, Ind.
The author thanks Mary Ellen Cross, Michigan State University, East Lansing, for drawing the illustrations.

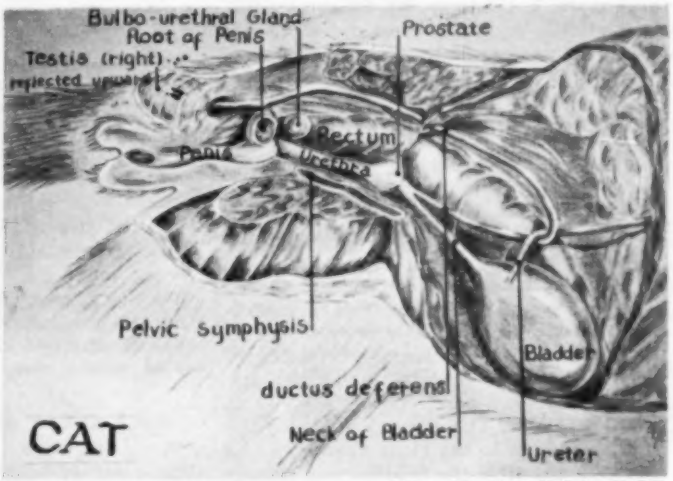
[1]Thatcher, F. S., and Simon, W.: The Resistance of Staphylococci and Streptococci Isolated from Cheese to Various Antibiotics. Canad. J. Pub. Health (Oct., 1955): 407-409 (abstr. J.Am.M.A., May 19, 1956:291).

incision. The incision is then securely packed with a nylon water-proof drape to keep urine from leaking into the abdominal cavity.

The bladder is opened near the fundus and the urine is drained over the back end of the drape and the table. The bladder is then entered with a gallbladder scoop, as used in human medicine, and the mucus and calculi are scraped out. The bladder is irrigated with warm Ringer's solution pumped in by a Shikle's syringe and an Andrew's catheter which is manipulated cautiously. Washing is accomplished slowly, without applying too much pressure, because the feline bladder has a long, constricted neck (fig. 1, 2) which ruptures easily.

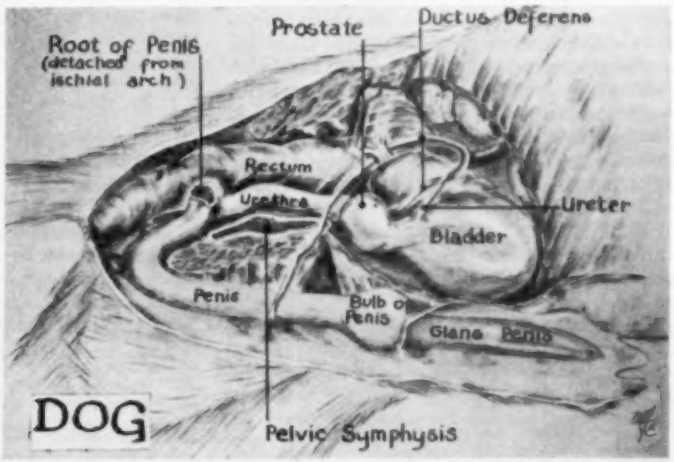
By constant washing and gradually inserting the catheter a little farther into the neck of the bladder, the obstruction is usually washed away. If the obstruction remains, it is best to approach the impaction by flushing from the other end of the penis with a blunt 2-inch, 20- or 22-gauge hypodermic needle and syringe, forcing the plug back into the bladder.

When the urethra has been cleared and



—College of Veterinary Medicine, M. S.U.

Fig. 1—Sketch of a ventrolateral view of a male cat, with the right pelvic bones and caudal portion of the abdominal wall removed to expose the urogenital organs. The right ductus deferens, inguinal ring, and spermatic cord, which normally passes caudad, ventral to the pelvis, are reflected upward to better expose the other organs (compare with fig. 2).



—College of Veterinary Medicine, M. S.U.

Fig. 2—Sketch of a similar dissection of the male dog.

the bladder cavity cleaned, a short open steel catheter, made from a 3½-inch teat cannula, is inserted into the urethra as far as possible by way of the bladder. Then a piece of capillary plastic tubing* is inserted through the cannula until it protrudes from the end of the penis. The cannula is then removed and the tubing is cut off, leaving a free end of about 2 inches in the bladder. The bladder is sutured and the abdomen closed. The end of the tubing that protrudes from the penis is tacked to the skin.

The purpose of the tubing is to start and maintain drainage from the bladder. After three days, the tubing can be removed if the patient is progressing satisfactorily and the urine appears normal.

DISCUSSION

During the convalescent period, the pH of the urine is tested frequently and treated with an acidifier** in an effort to keep it acid. Alkaline urine favors both the growth of most bacteria of the urinary tract and the precipitation of sand and mucus.

Atony of the bladder often develops and hampers convalescence. In this complication, the hair around the end of the penis is often wet from involuntary dribbling of urine. Palpation reveals an atonic distended bladder which retains from 50 to 100 cc. of urine. The atony is probably the result of injury to the bladder muscles and nerves at the time the bladder was acutely distended.

To correct this, a powerful parasympathetic stimulant is needed. Urecholine chloride (Bethanechol chloride**), either injected intramuscularly or given orally in tablets, is recommended. The dose varies with the individual and with the injury to the bladder. Usually 2.5 mg. is given intramuscularly. This drug could cause serious injury to a bladder if the urethra is not open when given.

When the cat is well enough to be dismissed, the owner is instructed how to determine the pH of urine and to give the acidifier tablets (½ tablet twice daily) to maintain a pH of at least 6. To avoid future trouble, the use of the pH test and an acidifier must be a permanent daily procedure.

*Becton, Dickinson and Co., Rutherford, N. J.
**Chloroethamine, product of Pitman-Moore Co., Indianapolis, Ind.; Bethanechol chloride, Merck and Co., Inc., Rahway, N. J.

Artificial Breeding of Range Cows.—Some ranchers see artificial insemination of their beef cows as the best and quickest way to improve a herd. In one Kansas herd, the percentage of high-choice calves was increased from 31 per cent in 1954 to 77 per cent in 1957. A few have tried it and quit because of low pregnancy percentages, partly because range cows are difficult to drive when in estrus. However, others have found it more satisfactory and economical than using bulls.—*Farm J. (April, 1958): 58.*

Abortion in Cows Due to Avian Tubercle Bacilli.—Two cows aborted on farms, in Germany, which had been free of bovine tuberculosis for four years. Tubercle bacilli were demonstrated in the uterus, placenta, and milk from 1 cow. Of the other 8 cows in the herd, 3 reacted slightly to avian tuberculin but not to bovine tuberculin. Chickens on nearby farms had tuberculosis.

In the second cow, tubercle bacilli were demonstrated only in the uterus and placenta, and none of the other 12 cows in that herd reacted to either tuberculin. Chickens on this farm had died from tuberculosis the previous year.—*Vet. Bull. (Feb., 1958): Item 327.*

Air Embolism Hazard During Phlebotomy.—Two cases, in man, are reported where air embolisms occurred during the collection of blood from donors. In both, the gravity flow ceased when air pressure built up in the bottle because the air escape valve was not functioning. In both, the tourniquet was released without placing a clamp on the tube and air was forced upward from the bottle into the vein.

Both young men developed distress and subxiphoid pain, and one became cyanotic. Both were turned on their left side and seemed normal after a few hours.

The phlebotomy tube should always be clamped before releasing the tourniquet on the donor's limb.—*New England J. Med. (Feb. 27, 1958): 424.*

Relaxin Increases Water in Tissues.—When relaxin was given to immature rats, it resulted in an increased concentration of water in the uterine tissue, which reached a maximum in six hours.—*Vet. Bull. (Feb., 1958): Item 586.*

Experimental Therapy of Fly Strike in Sheep, Using a Systemic Insecticide

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ATTEMPTS TO DEVELOP systemic insecticides have met with failure except in a few instances.[6] The properties of ET-57* (0, 0-dimethyl, 0-(2,4,5-trichlorophenyl phosphorothioate), and its effectiveness in killing cattle grubs when administered orally to cattle, were reported in 1956.[2] The drug was shown to have some effect against lice of cattle and screwworm larvae located deeply in the tissues.[2] It has been adequately demonstrated that the compound is effective in killing the larvae of Hypoderma.[1,3,4,8,9]

The usual method of treating sheep for fly strike is to clip the wool from the affected area and apply a preparation containing an insecticide and a repellent. This method of treatment is laborious when large numbers of sheep are involved and may be so time consuming that it is impossible to treat all the individuals requiring attention. An alternative to individual treatment is to dip the whole band in an insecticide; however, dipping vats are not always available when needed. This paper describes treatment of sheep for fly strike with ET-57, an organic phosphate systemic insecticide.

MATERIALS AND METHODS

Twenty-eight sheep (20 ewes and lambs, 8 rams) with naturally occurring fly strike were treated by oral administration of the drug from the middle of July to the first week in September, 1957. Nineteen ewes and lambs from the Montana Veterinary Research Laboratory flock were infested as a result of soiling of the breech area. No measures were taken to promote or to prevent fly strike, and no sheep were treated in the early stages of the infestation. One ewe with an infestation in a wound 4 inches long and 2 inches deep in the pectoral region was brought to the laboratory from the Montana Agricultural Experiment Station band of range sheep.

Of 16 Rambouillet rams pastured on a small, shaded, river bank pasture, 11 were infested with blowflies in the head region. When we were consulted, 3 of the rams had died and the other 8 had infestations in varying degrees of severity.

Initial treatment consisted of administering the drug, by mouth, in the form of a bolus.† The amount of drug given to the ewes and lambs ranged from 2.5 to 10.0 Gm., orally, per treatment (table 1). Seven mature ewes were given 10.0 Gm. (176 mg./kg. of body weight), 3 were given 7.5 Gm. (135 mg./kg.), and 2 yearling ewes were given 111 and 167 mg./kg. of body weight, respectively. The lambs weighed 35 to 50 lb. and were given 2.5 to 7.5 Gm. each (132 to 310 mg./kg.).

After evaluating the effect of the systemic insecticide, the sheep were clipped, when necessary, and another insecticide was applied to the affected area to kill any remaining larvae or to prevent reinfestation.

Since the owner of the rams did not wish to incur any additional death loss, all affected rams were given 10 Gm. of the drug by mouth, and other insecticides were applied to the head. When examined 48 hours later, the oral treatment was repeated in 1 ram and, after clipping the wool, several were given a second application of the topical insecticide.

The insecticides used on the heads of the rams and the breech areas of the ewes and lambs were either an aqueous suspension of 0.1 per cent dieldrin or a preparation containing 3.0 per cent lindane, or both.

RESULTS

Of 10 mature ewes treated orally, 7 were essentially free of larvae in 48 hours (table 1). Ewe 4 was treated twice, on July 22 and 31. She had been left in the pasture after the first treatment to determine whether the drug had value in protecting against infestation. Nine days later, she was again severely infested and was retreated with 10 Gm. of the drug. Both treatments were successful. After the second treatment, lindane was applied to prevent reinfestation.

Ewe 5 was originally treated for moderate fly strike by clipping the wool and applying lindane. Six days later she was severely reinfested. Treatment with 10 Gm. of the systemic drug eliminated the maggots feeding deep in the tissues, but it had no effect on those in the wool and on the

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*The ET-57, now termed Trolene, used in these experiments was supplied by the Dow Chemical Co., Midland, Mich.

†Formula No. M959, Dow Chemical Co., Midland, Mich.

surface of the skin. The ewe was left in the pasture and, on two successive days, no larvae were seen in the areas where larvae had been feeding below the surface of the skin. On the fourth day, the ewe showed signs of toxicosis and was brought to the laboratory. She was suffering from an extensive superficial infestation of blowfly larvae. The wool was completely detached from the skin on the entire right flank and extending beyond the median line on the back. The surface of the skin was blackened, mummified, and covered with huge numbers of larvae, but few of them had penetrated the skin. The ewe was retreated with 10 Gm. of the drug, but was destroyed *in extremis* four days later. In this extensive superficial infestation, the systemic drug was of no value.

Ewe 8 was suffering from a severe infestation of blowfly larvae extending from the tail to the middle of the back and onto the flanks. The larvae were beginning to invade the skin. Two days after treatment, a small number of larvae were found in the wool, and it was necessary to apply conventional treatment to obtain complete removal.

When ewe 10 (the one with the deep sternal wound) was brought to the laboratory, the wound was infested with innumerable fly larvae, and she was beginning to show signs of intoxication as a result of their invasion. The maggots had worked deeply into the muscle, and topical treatment with an insecticide was considered to be of no value. The ewe was given 7.5 Gm. of the drug by mouth. Sixteen hours later there was only slight improvement. Forty hours after treatment no larvae were found in the wound, the seeping of a serosanguineous fluid had ceased, and there was only a small amount of pus on the injured internal surfaces. Recovery was satisfactory.

Clear-cut results were observed in ewes 1, 2, 3, 4, 9, and 10. They were completely free of blowfly larvae within 48 hours of treatment. All had relatively localized infestations, and the larvae were feeding below the surface of the skin. However, this treatment was of less value in ewes 5,

TABLE I—Treatment of Fly Strike in Ewes and Lambs with ET-57

Sheep		Description of strike			Oral dose	Larvae present 24-48 hr. after treatment	Remarks
(No.)	(Age)	Severity		Affected areas	(Gm.)		
1	Mature	++*	Deep	Tail stump	10.0	None	.....
2	Mature	++	Deep	Rump and crotch	10.0	None	.....
3	Mature	++	Deep	Rump and crotch	10.0	None	.....
4	Mature	++	Surface	Left hindleg	10.0	None	Reinfested within one week.
		+++*	.....	Rump, at right of tail	10.0	None	.....
5	Mature	+++	Deep and surface	Rump, back, flanks	10.0	None in deep areas	Extensive superficial infestation not affected.
					10.0	No effect	Killed in extremis 10 days after first treatment
6	Mature	+++	Deep and surface	Rump, back, flanks	10.0	.....	No larvae alive after 7 days; dead larvae in wool and on surface of skin.
7	Mature	+++	Deep and surface	Rump, back, flanks	10.0	Few alive	Many dead larvae in wool and on skin
8	Mature	+++	.....	From breech to loins	7.5	Nearly all dead	A few small pockets of larvae in the wool.
9	Mature	++	Deep	Rear of right thigh	7.5	Two only	.....
10	Mature	+++	Deep	Deep sternal wound	7.5	None	Little improvement at 16 hours; complete recovery at 40 hours.
11	Yearling	++	Deep	Perineum	5.0	.....	No larvae at 72 hours.
12	Yearling	++	.....	Tail and left hip	7.5	None	Infested following dog bite.
13	Lamb	+++	.....	Base of tail and breech	5.0	None	.....
14	Lamb	++	.....	Midline below anus—later spreading to scrotal area	5.0	None	Some temporary intoxication from drug; partial recovery at 19 hr.; complete at 26 hr.
15	Lamb	++	.....	Breech on left side	2.5	No reduction	No live larvae 72 hours after treatment.
16	Lamb	++	Deep	Right hindleg	3.0	.....	No live larvae 96 hours after treatment.
17	Lamb	+++	.....	Thighs, tail, head, back	5.0	.....	Died within 24 hours of treatment.
18	Lamb	++	.....	Right hindleg	5.0	None	.....
19	Lamb	+++	.....	End of tail and breech	5.0	None	.....
20	Lamb	+++	.....	Hindlegs	7.5	None	.....

*++ = moderate infestation; +++ = severe infestation.

6, 7, and 8 in which the infestations were, to a great extent, superficial. Most of the larvae on ewe 8 had been eliminated, but clipping the wool and application of a lindane preparation was necessary for complete elimination of the blowfly larvae.

Two yearling ewes and 8 lambs were treated for breech strike, and 6 of the 10 were free of fly larvae within 48 hours. In 2 cases, observations were not made until 72 or 96 hours after treatment, but no live larvae were found. Lamb 15 was not improved 48 hours after treatment. Lamb 17, suffering from a severe superficial infestation, died within 24 hours of treatment.

Lamb 14, a wether brought in from pasture suffering from a localized infestation just below the anus, was left untreated for two days, and the infestation spread to the region of the scrotum. Nineteen hours after he was given 5 Gm. of the drug, about two thirds of the larvae had been eliminated, and in 26 hours no larvae were in the lesion.

Since the 8 Rambouillet rams were given local as well as the systemic treatment, evaluation of the latter is possible in only a few of the individuals. Two of the rams were weak from the effects of the infestation and the larvae were feeding deep in the tissues. In one, the periorbital fat of the right eye had been invaded and the right auditory canal was completely plugged with larvae. In both rams, there was a mass of larvae between the horn and the side of the head. Two days after treatment, larvae were still alive in 1 ram—1 of the 2 most severely infested. All larvae deep in the tissues on the head had been killed, but to stop the extensive superficial infestation, it was necessary to clip the wool and apply an insecticide topically on two occasions.

Toxic side effects did not present a significant problem. Lamb 17 died within 24 hours of treatment (260 mg./kg. of body weight) but death probably was due primarily to the infestation. Lamb 14 was given 310 mg./kg. of body weight, and within 20 minutes, began to show signs typical of poisoning by organic phosphorus compounds,[5] but unlike those generally seen in ET-57 intoxication.[7] The lamb salivated profusely and walked restlessly about the pen. During three hours of observation it did not become worse, and in 18 hours it had recovered completely. No side effects were observed in any other sheep which were treated.

Discussion

Of 20 ewes and lambs treated orally with an organic phosphorus compound for infestation with blowfly larvae, 12 recovered within 48 hours (No. 1, 2, 3, 4, 9, 10, 12, 13, 14, 18, 19, 20); 3 (6, 7, 8) made partial recoveries, and treatment failed completely in 2 cases (5 and 17). In 3 cases (11, 15, 16), elimination of larvae either required longer than 48 hours or no observations were made until more than 48 hours had elapsed since treatment.

Of the 8 rams treated for blowfly strike in the head region, it was possible to evaluate the effect of the drug in only 2. These rams were already weak and the infestations were deep; however, the larvae were completely removed from the areas of deep infestation, but in 1 ram an extensive superficial infestation was stopped only by a second supplementary treatment with a topically applied insecticide.

The most prompt and complete elimination of larvae occurred in those sheep where the larvae were feeding below the surface of the skin. The failures and partial recoveries occurred in individuals with superficial infestations. This drug appeared to be of no value in cases where the skin had become blackened and mummified as a result of larval activities. It is obvious that the fly larvae must have some contact with the blood or tissue fluids to be affected by the drug.

The toxicity of this drug for mammals, when given orally, is fairly low. Cattle, for example, have been given 500 mg. per kilogram of body weight, with no deaths occurring.[5] In limited studies, sheep were not affected by 100 mg./kg., but at 400 mg./kg., mild intoxication was seen.[7] In our experiments, the therapeutic dosage levels ranged generally from 150 to 200 mg./kg. without producing evidence of intoxication. However, lamb 14, given about 310 mg./kg. of body weight, almost immediately showed typical signs of organic phosphorus poisoning. Lamb 17 died following administration of 260 mg./kg., but it is unlikely that the drug was the primary cause of death. Therapeutic levels for elimination of blowflies of sheep were obtained at 150 to 200 mg./kg. without evidence of intoxication.

Despite good recoveries from fly larvae

infestations, this systemic treatment appears to give little or no protection against reinfestation. Treated sheep were reinfested when left in the pasture, and sheep housed in an unscreened building after treatment still attracted flies, although none were reinfested. Under normal conditions, this drug can not be used alone to treat fly strike. A repellent or a topically-applied insecticide should be used to prevent reinfestation.

Minimum therapeutic levels have not yet been determined, and additional observations should be made to determine the lowest effective dose of the drug.

SUMMARY

1) Of 20 ewes and lambs treated for fly strike by oral administration of Trolene (Dow ET-57), 12 recovered completely within 48 hours; 3 made partial recoveries; 2 did not recover. Three sheep either required longer than 48 hours for elimination of larvae, or no observations were made until more than 48 hours had elapsed following treatment.

2) Of 8 Rambouillet rams treated with both the systemic and topical insecticides for head strike, only 1 failed to recover within 48 hours.

3) Effective oral dosage levels for elimination of blowfly larvae ranged from 150 to 200 mg. per kilogram of body weight.

4) Toxicosis was seen only in a lamb given 310 mg. per kilogram of body weight.

5) Recoveries from blowfly infestations, following administration of the drug, were most prompt and complete in sheep where the larvae had penetrated the skin. For superficial infestations, this treatment was of little value.

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Systemic Insecticide Sprays

A new chemical, Bayer 21/199, has been found highly effective in controlling cattle grubs and screwworms when sprayed on the animals. This organic phosphorous compound, used either as an emulsion or suspension, is absorbed through the skin. When applied as an emulsion (0.25 to 0.75 per cent; 1.5 gal. per animal, under 300-lb. pressure) to 48 yearlings in November, 1956, a total of 8 grubs later appeared in only 2 animals, whereas 16 controls averaged 44 grubs.

When 1 qt. of spray was used on 11,000 sheep on nine Texas ranches immediately after shearing, the sheep were protected from screwworm infestation for ten to 20 days, long enough for wounds to heal. It was equally effective on 408 animals after castration, docking, and treatment of old screwworm wounds. The parasites are killed both upon contact and through systemic action. The prolonged effect of the compound is due to tiny particles that drop off the animal's hair or wool into the wound.—*Agric. Res. (March, 1958)*: *12.*

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A cow with 12 third-stage larval *Hypoderma bovis* in her back, in 1956, was fed radioactive Bayer L 13/59 (25 mg./kg. of body wt.). The peak of radioactivity in the blood occurred in one to three hours. Less than 0.2 per cent of the drug was recovered in the milk in six days and less than 3 per cent in the feces. The peak excretion in the urine occurred in four to eight hours. Only a low level of radioactivity was found in the warbles removed at intervals from the cow's back.—*Vet. Bull. (Feb., 1958)*: *Item 473.*

[Bayer L 13/59 is 0,0-dimethyl-2,2,2-trichlorethyl phosphonate. A Russian product with similar activity, called "chlorophos," is 0, 0, dimethyl-2,2,2-trichlor-1-oxyethyl phosphonate (*Vet. Bull.*, Feb.,

1958: Item 470). Dow ET-57 is 0,0-dimethyl-0-2,4,5-trichlorophenyl phosphorothioate.]

Treating Elaeophoriasis in Sheep

Filarial dermatosis, known as "elaeophoriasis" or "sorehead," which has been observed in New Mexico since 1932 and occurs chiefly in the southwestern mountain states but more recently has been reported as far north as British Columbia, is found only in sheep grazing at altitudes above 6,000 ft.

The parasite, *Elaeophora schneideri*, is zoologically related to those causing dirofilariasis or heartworm in dogs. The adult worm resides in the artery, while its larvae are caught in the regional capillaries and live in the skin. The result is large bleeding lesions, chiefly on the face, feet, and abdomen, often resulting in blindness, lameness, and emaciation.

In 1946, antimony compounds were found effective but had to be repeatedly injected intravenously or intramuscularly. Recently, two equally effective treatments have been developed: Dow ET-57 (300 mg./kg. of body wt.) via the rumen, and piperazine hexahydrate (4 oz./gal.) in drinking water for three days or 6 oz. as a single drench.

The parasite is probably carried by mosquitoes and gnats.—*Agric. Res. (March, 1958): 13.*

Elaeophoriasis and Leather.—Small hemorrhagic or scarred nodules, about 2 mm. in diameter, in sheepskin were believed to be caused by the nematode *Elaeophora schneideri*. The lesions spoiled leather made from the affected skins.—*Vet. Bull. (Feb., 1958): Item 634.*

Microfilaria in Cats in India.—Sheathed microfilaria, resembling those of *Wuchereria malayi*, were found in the blood of 2 of 57 cats in India. A few of the local people were infected with this parasite.—*Vet. Bull. (Feb., 1958): Item 494.*

Effect of Sodium Chloride on Urinary Calculi in Sheep.— Urinary calculi developed in 14 of 60 wether lambs when they were fed all they would consume of experimental rations twice daily for 105 days. No calculi developed in the 30 sheep fed this ration plus 10 per cent sodium chloride. Of the 14 cases, 11 were in lambs fed potassium acid phosphate (K_2HPO_4). Beet pulp or pulp ash had no effect on the incidence of the calculi.—*Vet. Bull. (Feb., 1958): Item 530.*

Treating Lungworms in Cattle

When 37 calves, 9 to 12 months old and heavily infected with *Dictyocaulus viviparus*, were given, orally, 1 mg. of diethylcarbamazine per pound of body weight, none died, whereas 11 to 37 untreated controls died or had to be destroyed.

When younger calves were experimentally infected then, 14 to 18 days after infection given 25 mg./lb. of body weight of this drug, daily for five days, there were no deaths and the calves made reasonably good gains. Treatment at later stages was less effective; deaths were delayed but not prevented. Larval counts in the feces were depressed in treated calves. The optimum dose has not been established.—*Vet. Bull. (Feb., 1958): Item 489.*

Safety of Cyanacethydrazide for Cattle.—When 200 cattle, 100 of them lactating, were given therapeutic doses of the lungworm parasiticide, cyanacethydrazide, on three successive days, either orally (18 mg./kg.) or subcutaneously (15 mg./kg.), the milk yield was affected only slightly. After the second treatment, temporary anorexia was noticed in a third of the cattle that were in poor condition, regardless of the method of administration.—*T. W. Groves in Vet. Rec. (March 8, 1958): 219.*

In three trials with 29 cattle treated with cyanacethydrazide, and 19 controls, there was little if any difference in the final condition of the two groups. Their parasite burden was not ascertained. In uncomplicated, mild to moderately severe cases, removal of the animals from the source of infection, improved nutrition, and adequate shelter seemed more important than removal of the parasites.—*Vet. Bull. (Feb., 1958): Item 490.*

Swine May Be Carriers of Aftosa.—Swine may harbor the virus of aftosa (foot-and-mouth disease) with few or no signs of the disease and may thus act as carriers.—*Vet. Bull. (March, 1958): 746.*

Abortion Attributed to *Listeria Monocytogenes* Infection in a Range Herd of Beef Cattle

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SINCE *Listeria monocytogenes* was first isolated from an aborted bovine fetus in 1939,[8] there have been numerous accounts of bovine abortion attributed to infection with this organism. The great majority of these accounts report the sporadic occurrence of abortion in 1, or a few, individuals of a herd, or they are records of the recovery of the organism following the routine examination of aborted bovine material in diagnostic laboratories.[1-3,5,6,8-12,14-21] These reports generally do not provide details of the clinical histories of the herds involved, though most appear to be dairy herds.

In two accounts of bovine listeric abortion, numerous abortions occurred in the herds involved and some details on the histories of these herds were presented. In a herd of 50 Hereford heifers shipped from Canada to Ohio in the fall, 6 of the heifers aborted in February and *L. monocytogenes* was recovered from 1 of 3 fetuses examined bacteriologically.[7] Six abortions were reported[4] in a herd of 69 Hereford heifers in California and the organism was isolated from the lungs, liver, and stomach contents of 1 fetus. The animals in the herd had been bought two months prior to the first abortion.

The purpose of this report is to describe the occurrence of abortion, attributable to infection with *L. monocytogenes*, in a herd of beef cattle under range conditions in which 8.8 per cent of the breeding cows aborted.

HERD HISTORY

The affected herd consisted of 250 Hereford breeding cows maintained on a ranch comprising 20,000 acres of semiarid grazing on both sides of a river in southwestern North Dakota. The cows, ranging from 3 to 10 years old, had been with bulls under range breeding conditions during the summer of 1956 and were expected to start calving by mid-April of 1957. No recent additions had been made to the breeding herd and there was no history of abortions in previous years. Sheep had not been kept on the premises for ten years. The land area of the ranch was not heavily infested with rodents, and no dead rodents had been observed at any time.

During the winter of 1956 to 1957, until February 8, the cows were provided with native grass hay and thistle hay to augment the available range grazing. The thistle hay was evidently affected with a white mold growth. On February 8, silage from a previously unopened pit was offered for the first time. The silage pit contained green-cut, home-grown corn (rainbow flint) silage which included little cobbed-corn but many weeds; it had not been treated with liquid molasses, but was watered in the pit during preparation. Silage from the upper layers of the opened pit was discarded, but some cows may have had access to it. At the time the silage was first offered, the range was snow-covered and the previous hay ration was withdrawn.*

At about the same time the silage was first being fed, the owner observed that the majority of the cows in the herd apparently preferred to take water from the river rather than from the tanks supplied by artesian wells. At that time, the river water was at a low level, almost stagnant, and was discolored with mud brought into it by melting snow in the nearby gullies.

Five days after the commencement of silage feeding, several cows were noticed to be off-feed and appeared depressed, and in the period from February 13 to 21, 6 cows died. Silage feeding was discontinued

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*Since submitting this paper for publication, the work of Goyon, M. and Lecomte, S. (Rec. Med. Vet., 133, (1957): 647-654) has been brought to our attention, in which serological titers and monocytosis are reported in cows aborting as a result of L. monocytogenes infection following upon the feeding of silage from a newly opened silo.

from February 16 to March 5 and was then continued until calving was finished. The cows that died showed depression and inappetence. They showed no signs of bloat or of encephalitis. The course of the disease was one to five days and, in most cases, diarrhea was evident just prior to death. One of the 6 cows aborted the day before she died; the other 5 were still pregnant.

At necropsy on 1 of the cows, gross edema was found in the mesentery and a large quantity of fluid was in the rumen. There was no evidence of rumenitis or enteritis. Three other cows were examined postmortem by the owner, who reported similar general findings.

Other cows became ill at the same time and many of them aborted about seven days after the first signs of illness. Abortions occurred in other cows showing no illness, first in rapid succession and then sporadically, over the period from February 21 to March 13. In this period, a total of 21 cows aborted. The aborted fetuses were about 30 lb. in weight and appeared to have been dead *in utero* for a short period before expulsion, but none of them showed advanced decomposition. All the aborting cows retained the fetal membranes for seven to eight days, in the absence of treatment, or for one to two days following stilbestrol injections. All of the dead and aborting cows were young animals of either 3 or 4 years of age.

MATERIAL EXAMINED

On March 10, 1957, the contents of the stomach of an aborted fetus were submitted to this laboratory by the attending veterinarian. From this material, *L. monocytogenes* was isolated. On March 21, one of us (S.Y.) visited the ranch and examined 16 cows that had aborted and were being held in a fenced pasture. Clotted and oxalated blood samples were collected from these cows and direct blood films made from them. Vaginal or uterine exudate was collected from 7 cows.

At that time, all of the aborted cows had already been treated by the intrauterine administration of 3 boluses containing sulfanilamide, sulfathiazole, and urea, 1 capsule containing tetracycline hydrochloride, and the intramuscular administration of 2,500 mg. of streptomycin. The owner could not stipulate the exact time at which each animal had aborted, but the most recent abortion had occurred eight days previously.

All of the cows were found to have an inflammatory exudate in the vagina. This exudate was usually mucoid in type, but in several cows it appeared mucopurulent and, in some cows, it contained necrotic shreds of fetal membrane. All cows appeared normal otherwise at the time of examination.

BACTERIOLOGY

A pure growth of blue-white, shiny, entire colonies developed on blood agar plates streaked with the stomach contents. After 48 hours' incubation, the colonies were less than 2 mm. in diameter and were surrounded by a very narrow zone of *beta* hemolysis. Smears revealed small, regular, gram-positive rods. The organism produced acid without gas from glucose, rhamnose, salicin, and glycerol. Dulcitol, xylose, and inositol were not fermented. There was a uniform turbidity without pellicle in broth. Cultures held at 37 C. were nonmotile, while room temperature cultures were actively motile. Litmus milk was acidified and reduced. Indol and hydrogen sulfide were not produced, and nitrates were not reduced to nitrites. The morphology and the cultural and physiological characteristics were considered typical of *L. monocytogenes*.

Four pregnant guinea pigs were inoculated with 0.3-ml. amounts of the stomach contents, 2 by the intraperitoneal and 2 by the cardiac route, on the day that the material was received. On the third day following inoculation, 1 of each pair died and the other 2 aborted and were killed. All 4 sows showed severe uterine inflammation and, in each instance, the organism was isolated in uterine cultures.

A rabbit given 0.1 ml., intravenously, of a saline suspension of the organism adjusted to an optical density of 0.65 died three days after inoculation. The organism was isolated from the brain, liver, and kidneys. The monocyte count at the time of death was 29 per cent, as compared to counts of 0 per cent and 2 per cent on the two days prior to inoculation.

The vaginal material from 7 of the aborting cows was cultured on blood agar plates and in Albimi Brucella semisolids. Although various organisms were isolated, none was identified as *L. monocytogenes*. A second isolation attempt, made after the original material had been held at refrigerator temperature for three months, also failed.

SEROLOGY

Serum samples from 16 of the cows which aborted were found to be negative to the Brucella agglutination test. The samples were used in agglutination tests

TABLE 1—Results of Listeriosis Agglutination Tests on Herd Serum Samples (Readings After 42 Hours' Incubation at 37 C.)

Cow serum	Dilutions of Serum					
	100	200	400	800	1,600	3,200
1	+	+	+	−	−	−
2	+	+	+	±	−	−
3	+	+	+	±	±	−
4	+	+	+	+	−	−
5	+	+	−	−	−	−
6	+	±	−	−	−	−
7	+	+	+	+	−	−
8	+	+	+	−	−	−
9	+	+	±	−	−	−
10	+	+	+	+	−	−
11	+	+	+	±	−	−
12	−	−	−	−	−	−
13	+	−	−	−	−	−
14	−	−	−	−	−	−
15	+	+	−	−	−	−
16	+	+	+	±	−	−

+ = complete agglutination; ± = incomplete agglutination; − = no agglutination.

with an antigen prepared from a culture of the strain of *L. monocytogenes* isolated from the aborted fetus from this herd. Considerable difficulty was experienced in interpreting the results of these tests, partly because of prozone-like phenomena and partly because of the variability of the results with different strengths of antigen suspension and with different periods of incubation of the test serum-antigen mixtures. Finally, by using an antigen suspension treated with 0.3 per cent formalin and standardized between McFarland tubes 1 and 2, and by reading the test results after 42 hours' incubation at 37 C., consistent results were obtained (table 1). Three of the 16 serums had titers of 1:800, six had titers of 1:400, three had titers of 1:200, two had titers of 1:100, and two samples were negative.

Because of the difficulties experienced in making this test, and since serum samples were not obtainable from nonaborting cows in this herd, it was considered advisable to test the serums of beef cattle from other herds in Montana not having any history of abortion. Eleven serum samples from a group of experimental steers belonging to this laboratory were tested. Nine had titers against *L. monocytogenes* of 1:100 and 2 were negative under the same condition of test. Five serum samples from range beef cows at the U.S. Range Experiment Station in Miles City were tested. Three had titers against this antigen of 1:200, and 2 of 1:100. No explanation for these low-level titers in apparently normal beef cattle could be found.

HEMATOLOGY

Five of the 16 animals (table 2) showed a relative monocytosis as indicated by differential white blood cell counts in which monocytes represented more than 15 per cent of the total number of leukocytes. However, only 2 of these animals showed monocytes present in the circulation in numbers exceeding 1,000 cells per milliliter of blood.

Five of the animals (cows 4, 8, 10, 11, and 13), including 2 of those with a relative monocytosis, showed some degree of leukopenia as indicated by total white blood cell counts below 4,500 per milliliter of blood. In 1 of these 5 animals (cow 4), moderate neutropenia was present as indicated by a differential neutrophil count below 15 per cent of the total leukocytes.

DISCUSSION

The numerous reports of the isolation of *L. monocytogenes* from aborted bovine fetuses suggest that this organism can

TABLE 2—Results of Hematological Examinations of Herd Blood Samples

Cow No.	Total r.b.c. (million/ml.)	Total w.b.c. (thousand/ml.)	Hb. (Gm./100 ml.)	Differential w.b.c. count						Total Mono./ml.
				Neut.*	(%)	Lymph.*	(%)	Eosin.*	(%)	Baso.* (%)	Mono.* (%)	
1	5.3	6.45	9.55	46	47	4	0	3				193.5
2	5.5	6.3	9.85	43	38	7	0	12				756.0
3	5.48	5.0	9.55	30	52	6	0	12				600.0
4	5.88	4.0	10.45	14	54	3	0	29				1,160.0
5	5.95	7.95	11.55	35	55	7	0	3				238.5
6	5.35	7.0	10.8	62	34	3	0	1				270.0
7	5.2	5.5	10.15	18	70	0	0	12				660.0
8	4.9	4.0	9.85	50	36	6	0	8				320.0
9	4.72	4.55	10.15	60	19	0	1	20				910.0
10	4.8	4.0	9.85	36	50	0	0	14				560.0
11	5.0	2.8	9.55	33	32	7	0	28				784.0
12	6.3	20.55	9.85	80	10	0	0	10				2,055.0
13	5.5	3.9	9.2	32	55	2	0	11				429.0
14	5.25	6.85	10.45	36	46	15	0	3				205.0
15	4.5	5.2	9.55	25	55	0	0	20				1,040.0
16	4.52	4.6	8.95	29	48	6	1	16				736.0

*Neut. = neutrophils; lymph. = lymphocytes; eosin. = eosinophils; baso. = basophils; mono. = monocytes.

play a pathogenic role in bovine abortion. It has been suggested that *L. monocytogenes* may be present at "normal" birth[12] and that the organism may be an opportunist,[7] but there appears to be no record of its isolation from apparently normal cows. In the bacteriological examinations of vaginal and cervical swabs from approximately 200 cows, *L. monocytogenes* was not isolated.[15] It is unfortunate that, in this report, only 1 specimen suitable for bacteriological examination was made available. The disease is attributed to listeric infection on the basis of the isolation of the organism from this 1 specimen, taken in conjunction with the demonstration of serum agglutinin titers of 1:400 or higher in nine of 16 serum samples examined.

Considerable doubt has been cast on the significance of serological results in the diagnosis of infections with *L. monocytogenes*. It has been demonstrated that agglutination titers against this organism may occur in the serums of clinically normal cattle having no previous history of abortion or encephalitis. However, in these reports the titers do not generally exceed 1:200. Titers of a higher order are usually considered indicative of recent infection with *L. monocytogenes*.

Little information is available on the significance of hematological findings of this disease in cattle. A relative monocytosis, without actual increase in total numbers of monocytes, accompanied by a neutropenia, has been reported[9] in 1 experimentally infected cow. Other reports of bovine listeriosis indicate that monocytosis is not a diagnostic feature of this disease. In this outbreak, a relative monocytosis appears to have occurred only in a minority of the aborting cows, while most of them showed no significant hematological findings.

These abortions were not accompanied by any evidence of encephalitis in the affected animals. Other records of bovine listeric abortion[8,13,19,21] support the view that this infection in cattle is not always accompanied by encephalitis. It is not possible, from the available information, to attribute the deaths of the cows in this herd to listeric infection, though it is significant that these deaths occurred immediately prior to the commencement of abortion in the herd.

A possible relationship of silage feeding to the onset of diseases due to *L. monocytogenes* has previously been indicated by many workers.[13] In this herd, the start of silage feeding preceded the deaths by five days and the abortions by about 12 days.

SUMMARY

1) This report describes a series of abortions in a range herd of beef cows following shortly upon the commencement of silage feeding. Of the 250 cows, 21 aborted and 6 died.

2) *Listeria monocytogenes* was recovered from the stomach contents of 1 aborted fetus, the only sample submitted.

3) Serological examinations of serum samples from 16 cows that aborted showed agglutinating titers for *L. monocytogenes* higher than 1:400 in nine of these samples.

4) The hematological examinations of blood samples from these same cows are reported. The results were not significant, though 5 animals showed a relative monocytosis.

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Stimulation of Weight Gains with Tissue Injections, in Russia

Filatov's studies of tissue therapy began with the problems of corneal transplantation and grew into the general biological application of tissue stimulation. Tissue suspensions prepared by his simple method have been shown to raise the hemoglobin content of the blood 10 to 16 per cent, increase the erythrocyte count 0.8 to 1.5 million, increase the leukocyte count 3 to 6 thousand, double the phagocytic activity of neutrophils, and triple the antitoxic index.

In numerous feeding trials with swine, the groups receiving the tissue injections made average daily weight gains 20 to 30 per cent greater than controls. In 43 days, a group of steers receiving tissue preparations made an average daily gain of 1,009 Gm. compared with 840 Gm. for the controls. As a result of these trials, the Ryazan Provincial Agricultural Administration ordered all collective farms engaged in the finishing of livestock to begin the use of tissue stimulators. Their experience has confirmed the conclusion that daily average weight gains in finishing cattle and swine are increased 20 to 30 per cent by tissue stimulation. In unthrifty animals, the effect is much more striking.

The tissue suspensions are prepared from parenchymatous organs of healthy animals. The spleen is preferred for ease of processing. The organs are collected at slaughter and held for four to five days in a refrigerator at 0 to 4 C. Then they are chopped in a sterile meat grinder and suspended in twice their volume of physiological saline solution. The suspension is boiled 60 to 90 minutes, held at room temperature for two to three hours, and restored to the original volume by the addition of saline solution. The suspension is put through the grinder a second time, then through a sieve and a double gauze filter. It is then bottled and autoclaved at 120 C. for one hour. The product is tested for sterility and lack of toxicity on mice. It can be used for four months. The dose is 3 to 5 ml. for swine and 5 to 10 ml. for steers, injected subcutaneously behind the ear.

The frequency of injection required has not been established with certainty. It is recommended that swine be treated every seven days in the last two months of fattening. One group of gilts came into estrus soon after treatment, while their untreated litter mates did not.—[*I. S. Iopa, I. A. Dankov, and G. M. Mannov, Ryazan Provincial Agric. Admin. and Vet. Bact. Lab.: The Use of the Tissue Preparations of Academician V. P. Filatov on the Livestock Farms of Ryazan Province. Veterinariya (Moscow), 34, (Oct., 1957): 25-29.*]—ROBERT E. HABEL.

The Interferon: It Interferes with Virus Multiplication.—During a study of interference with the growth of live virus in a chicken embryo, a new factor produced by inactivated influenza virus and named "interferon," was recognized. It was active against the viruses of influenza, Newcastle disease, and vaccinia.—*Vet. Bull. (Feb., 1958): Item 447.*

Chemotherapy of Blackhead in Poultry

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HISTOMONIASIS, or enterohepatitis, commonly known as "blackhead," is a disease of protozoan origin. The etiological agent is a microparasite which at first was believed to be an amoeba-like organism, but later was shown to be a flagellate, to which the name *Histomonas meleagridis*[50] was given.

Blackhead is widely distributed and has been responsible for serious losses among turkeys. Chickens also suffer from it, but mortality among them has been relatively low. Losses from blackhead in chickens, however, are reported to be on the increase.

The discovery, in 1920,[22] that the cecal worm, *Heterakis gallinae*, plays a role in the transmission of blackhead opened up another aspect of the disease. The entrance of these larvae into the mucosa of the cecal wall was believed merely to break down the resistance of the tissues and thus facilitate the ingress of the Histomonas which was already present in the ceca. This assumption was soon discarded[53] when it was found possible to produce blackhead in Histomonas-free birds by feeding to them embryonated eggs of the cecal worm which had been rendered bacteriologically and protozoologically sterile by submerging them in 1.5 per cent nitric acid for several days. This indicated that the Histomonas may actually be contained inside the cecal worm egg.

That the cecal worm is usually an essential factor in the transmission of blackhead under natural conditions has been demonstrated.[27,32,46] Therefore, a program for the prevention and control of blackhead should take into consideration ways and means of combating the cecal worm as well as the Histomonas. This would necessitate the use of phenothiazine, a specific for the suppression of the cecal worm, with a good histomonastatic agent, sanitation, and good management.

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During the 60 years in which blackhead has been recognized, numerous prophylactic and therapeutic compounds have been tested against it. Only within the last few years has there been any degree of success. The greatest progress has been in the field of prevention.

In this discussion, drugs of a similar nature are treated as a group. Within each group, one or more drugs have shown protozoastatic properties superior to the others. Such drugs will be given special consideration.

ARSENICAL COMPOUNDS

Studies showed that tryparsamide was active against blackhead, but the benefits were not sufficient to warrant the cost of treatment;[51] that both tryparsamide and 3-acetylamino-4-hydroxyphenylarsonic acid (Stovarsol*) had a retarding effect on the entrance of Histomonas into the body tissues;[45] and that 4-nitrobenzenearsonic acid effectively prevented histomoniasis when used within a nontoxic range.[39]

It was found that 4-nitrobenzenearsonic acid (Histostat**) was highly effective in preventing mortality from blackhead when fed at 0.0125 to 0.075 per cent in the mash, or at 0.006 to 0.04 per cent in the drinking water for three days prior to, and for 21 days after, experimental infection.[25] However, a high relapse mortality followed withdrawal of medication. Data also showed that mashes containing 0.01 to 0.03 per cent of this acid stimulated growth.

To be effective, 4-nitrobenzenearsonic acid must be employed in a continuous feeding program in which the birds are kept on medication until five days before slaughter; the withdrawal is to allow elimination of the arsenic from the edible tissues.

Continuous use of 4-nitrobenzenearsonic acid at 0.026 per cent (1 lb. of commercial mixture to 160 gal. of water, or 1 level tablespoonful in 4 gal. of water) produced

*Stovarsol is produced by Merck and Co., Inc., Philadelphia, Pa.

**Histostat is produced by Dr. Salsbury's Laboratories, Charles City, Iowa.

a decrease in egg production and significantly affected growth and livability of the poults.[40] During the three months that birds were on the experiment, egg production in the control group was 74.0 per cent, and in the treated group 68.9 per cent. Although no impairment in fertility and hatchability resulted, there was a probable depression in egg size and a significantly depressed size of poults at hatching time. However, at 8 weeks of age, no difference in body weights of poults hatched from eggs of the two groups was observed. It was reported[37] that 4-nitrobenzenearsonic acid had no adverse effect on egg production, fertility, or on weights of the progeny at 1 day and 3 weeks of age.

Mash containing acetarsol at 0.25, 0.05, and 0.01 per cent was said[20] to protect turkeys against blackhead, and no lesions were present on the forty-second day. All unmedicated birds died. In tests with the drug in the drinking water (0.01 Gm. per bird, daily), all poults survived and showed no evidence of blackhead on the forty-second day, while all unmedicated birds died. However, in other tests, sodium acetarsol did not give effective protection against blackhead, nor did it affect the cecal worm larvae.[49]

In conclusion, many of the arsenicals suppressed blackhead infection to some degree during the period of medication, provided it was started soon after infection. However, they apparently did not destroy all the organisms, since relapses frequently occurred within a few days after medication was withdrawn. Birds given 2-nitrobenzenearsonic acid and 4-nitrobenzenearsonic acid may be less likely to suffer relapse after termination of medication than poults given other arsenical compounds.

QUINOLINE COMPOUNDS

The preventive action of 1.0 per cent iodochloroxyquinoline against artificially induced blackhead of turkeys was reported in 1948.[17] In tests involving 39 medicated and 28 control poults, the death rate was 15.3 per cent in treated groups and 94.6 per cent in the control group. In one field test involving 104 birds, 24 controls (45.3%) and 10 medicated birds (19.6%), died of blackhead. This quinoline compound prevented blackhead when used at 1.0 and 0.5 per cent in the feed for 21 days, starting three days before infection.[38]

Chlorohydroxyquinoline, when administered in feed at 1.0 per cent, compared favorably with iodochloroxyquinoline in prevention of induced blackhead infection.[18] In a series of eight tests, of which five were with birds infected artificially and three with birds infected naturally, this quinoline derivative prevented blackhead induced experimentally but failed to prevent the infection from soil contamination.[16] In experimentally inoculated birds, infection occurred in 93.6 per cent of 55 controls and in 10 per cent of 50 poults given 1.0 per cent of quinoline derivative in an all-mash ration. In naturally infected birds, there was no significant difference between mortality in treated (30.7%) and the control (27.6%) groups.

Artificial infections were produced by oral and rectal inoculations of the blackhead organisms propagated in cultures, whereas natural exposures were induced by placing the poults on soil previously occupied by blackhead-infected turkeys. Under natural conditions, chickens and turkeys usually become infected by ingesting cecal worm eggs containing Histomonas.

NITHIAZIDE

As a result of testing the comparative antihistomonad activities of several 1-substituted-3-(5-nitro-2-thiazolyl) ureas, it was demonstrated[13] that the most effective were the 1-methyl and the 1-ethyl derivatives. The 1-methyl compound was slightly less effective and retarded growth rate considerably more than 1-ethyl derivative.

The 1-ethyl-3-(5-nitro-2-thiazolyl) urea (Nithiazide†) is related to 2-amino-5-nitrothiazole, but is said to be twice as potent in controlling mortality from histomoniasis. It had little effect on growth at 0.1 per cent in feed. Conversely, 2-amino-5-nitrothiazole greatly retarded the growth of young turkeys when given for two weeks at the above level.

When administered in the feed, beginning one day before, or three days after inoculation with Histomonas, this drug was effective in preventing mortality from enterohepatitis. There were no deaths from artificial infections of this disease when the drug was used at 0.05 per cent, while 73 to 83 per cent of the untreated

†Nithiazide is produced by Merck and Co., Inc., Philadelphia, Pa.

controls died.[12] When fed for nine days, commencing on the fifth day after infection, it was relatively ineffective at 0.025 per cent, but there was no mortality when used at 0.05 per cent. However, the nine-day period of medication was insufficient to prevent relapses, which occurred in 37 per cent of the birds.

Mortality from enterohepatitis was also effectively prevented by increasing the concentration of the drug to 0.1 or 0.2 per cent medication started on the seventh day after infection and continued for 14 days thereafter. Similarly, 0.01 to 0.04 per cent in the water, beginning three or seven days after infection, effectively prevented mortality from histomoniasis. When fed continuously in feed (0.0125 to 0.05%) for 62 days, this drug had no effect on growth rate, feed efficiency, sexual maturity, egg production, or on fertility and hatchability of eggs produced by turkeys.[14] Likewise, there was no effect on egg production when mature chickens were fed mash containing concentrations of 0.05 to 0.28 per cent for 14 to 19 weeks.

NITROFURANS

Various levels of nitrofurans were tested, both prophylactically and therapeutically, against histomoniasis in turkeys.[23] The continuous feeding of N-(5-nitro-2-furylidene)-3-amino-2-oxazolidone (furazolidone) at 0.0125 per cent in feed had a slight prophylactic effect when given before infection induced by feeding cecal worm eggs; the other nitrofuran compounds showed little or no histomonastatic activity. When fed continuously at 0.011 per cent, beginning three days prior to inoculation with Histomonas-bearing cecal worm eggs, furazolidone had a retarding effect on development of blackhead.[24] Signs of disease and deaths occurred in the treated groups three or four days after they had appeared in the control group. When fed at 0.02 and 0.022 per cent, this drug was more effective and, not only delayed appearance of the disease, but was responsible for milder infections and a smaller number of deaths.

It was shown that furazolidone, when fed therapeutically at 0.011 per cent, starting either two or nine days postinoculation with cecal worm eggs, substantially reduced losses in 3-week-old birds.[26] This drug effectively prevented blackhead when fed continuously at 0.011 per cent, but it was necessary to use 0.0165 per cent to stop epizootics of the disease.[25] This drug was highly effective in preventing deaths from blackhead when fed continuously at 0.01 and 0.02 per cent, beginning two days or more prior to administration of cecal worm ova.[27,28] However, when medication was withdrawn 15, 25, and 56 days later, relapses occurred.[29]

It was concluded that the action of the drug is of an inhibitory nature and that the Histomonas begins to multiply when medication is withdrawn or is used at a low level. Treatment at 0.04 per cent, followed by continuous medication at 0.01 per cent to prevent relapses, was recommended.

When furazolidone was fed continuously at 0.011 to 0.033 per cent for periods of one to two and one half months to turkeys on contaminated soil, mortality from blackhead was materially reduced.[10,11,30] However, there were some blackhead lesions in the treated groups and, in some instances, relapses occurred after the withdrawal of medication.

Furazolidone apparently is well tolerated by birds. Moreover, it exerted a growth-promoting effect when fed to chicks maintained in a contaminated environment.[2,3,26,31,36] However, at 0.03 per cent or above, food consumption was decreased, with a concomitant decrease in body weight. Caution should be used, therefore, in feeding this drug to birds that are to be used as breeders. Furazolidone appeared to have little, if any, adverse effect on the reproductive ability of pullets and turkey hens.[7,21,30,37] However, the feeding of this drug to cockerels and older male birds resulted in decreased weight and histological changes in the testes, with a reduction in the number of spermatozoa.[8,9]

ENHEPTIN COMPOUNDS

Among the first drugs to show practical value for the control of blackhead were the enheptin compounds. The compound, 2-acetylamino-5-nitrothiazole, which has recently replaced 2-amino-5-nitrothiazole, is said to have all the good features of the latter plus greater activity. Below 0.025 per cent, the former is reported to be about twice as effective as the latter, but at higher levels the two drugs are about equally effective. The former is also said to be less toxic and to cost less per unit of treatment.

It was reported that neither drug was of significant value when medication was delayed until an outbreak occurred.[24]

Mortality from blackhead was prevented by feeding mash containing 0.05 per cent 2-acetylamino-5-nitrothiazole continuously for 30 days, starting at the time of inoculation.[5] This drug did not affect feed consumption, weight gains, egg production, fertility, or hatchability when fed at 0.02 to 0.05 per cent for 18 weeks.[23] Without specifying percentage used, this drug reportedly caused testicular atrophy in White Leghorn males.[43] It was reported to have no effect on egg production, fertility, or hatchability when fed continuously at 0.0075 and 0.015 per cent for two weeks, or 0.015 and 0.03 per cent intermittently for 12 days to 12½-week-old Single-Comb White Leghorn chickens.[44] When fed continuously at 0.025 per cent for 27 weeks to toms and turkey hens, it did not affect weight gains or feed utilization.[15] However, when fed at this level continuously for 63 weeks, the treated birds averaged 1 lb. less than the controls, and their egg production was 5 per cent less, but there was no significant difference in fertility or hatchability of eggs.

Studies show that when fed to birds at 0.0125, 0.02, and 0.025 per cent for periods ranging from 21 to 28 days and at 0.015, 0.02, and 0.025 per cent for 43 to 69 days after inoculation with cecal worm eggs, 2-acetylamino-5-nitrothiazole reduced mortality from blackhead during the treatment period, but relapses occurred soon after mash was withdrawn. For continuous treatment, the preventive level recommended by the manufacturer is 0.015 per cent. This level is said to give the maximum protection with the least cost, but it will not prevent all losses. The recommended therapeutic level is 0.05 per cent fed for two weeks and followed by the preventive level until all danger of reinfection has been passed.

It was reported that 2-amino-5-nitrothiazole had a direct histomonacidal action on *H. meleagridis in vitro*.[4] At 0.05 per cent in the feed, it caused histomonads to disappear from the cecal droppings, but not all of them from the cecum.[19] Histomonads remained, in small numbers, in the glandular epithelium of the treated birds; these foci probably explained the relapses when treatment was discontinued. Since treated birds harbored fewer heterakids than the inoculated controls,[47,48] destruction of the heterakid larvae was believed to be an important function of this drug. Limited data showed that poults treated with 0.1 per cent of the drug harbored fewer heterakids than the inoculated controls or birds treated with furazolidone.[28,47,48]

PHENOTHIAZINE

Phenothiazine has little or no histomonastatic activity, but possesses a high efficacy for removal of the cecal worm, *H. gallinae*. When administered in single and repeated daily doses to infected chickens, it is 95 to 100 per cent effective.[1] When fed in mash at 0.5 per cent to infected chickens, nearly 100 per cent of heterakids were removed.[42] However, when phenothiazine was fed to chickens for prolonged periods, blackhead was not controlled.[54]

To determine effectiveness of phenothiazine treatment on acquisition of cecal worms and Histomonas, a program in which turkeys were to occupy the same plots from July to November for six consecutive years was initiated at the Parasite Research Laboratory at Beltsville, Md. Chickens heavily infected with both cecal worms and Histomonas were used initially to infect the plots, and no other attempt at reinfection was made. Beginning when the turkeys were placed on the soil, phenothiazine at 0.5, 1.0, and 2.0 per cent in mash was fed continuously for four to six weeks during the first three years and for the entire period of exposure during the last three years.

An analysis of data from the first three years' work showed that the drug did not prevent the acquisition of cecal worms or blackhead disease. At necropsy in the fall, the treated birds harbored immature cecal worms, while the untreated birds had both mature and immature worms, indicating that the drug had a higher efficacy against the mature than the immature worms. During each of the three years, about 50 per cent of the treated birds and 75 per cent of the untreated birds died of blackhead.

At the end of the fourth year, only 4 immature and no mature worms were recovered from the 35 treated turkeys, whereas several times that number of cecal worms, most of which were mature, were found in the untreated birds. Moreover, the loss from blackhead among the treated birds was only 11 per cent, while

in the untreated birds it was 47 per cent. During the sixth year, mortality from blackhead was 8 per cent in the treated birds; 70 per cent in the untreated. While the reduction in the number of worms and deaths due to blackhead in the treated groups as a result of phenothiazine medication was slight during the first three years, it was highly significant during the last three years.

DISCUSSION

Much of the early work on chemotherapy of blackhead involved testing and evaluation of various arsenicals as chemotherapeutic agents. Selection of these drugs at that time was largely on a basis of their activity against protozoan parasites of man and other animals. Tryparsamide, 3-acetylamino-4-hydroxyphenylarsonic acid, and neoarsphenamine were some which showed protozoacidal activity. When used against blackhead, however, the results were variable, and some were too toxic and too costly for routine use.

Not until 1950, when 2-amino-5-nitrothiazole was introduced, did the poultry industry have an effective and economical weapon to cope with the devastating losses due to enterohepatitis. This drug, however, had its limitations, and the search for a better histomonastatic or histomonacidal drug was continued.

Within the next few years, several compounds were shown to be effective in preventing blackhead, namely, 4-nitro-benzenearsonic acid, furazolidone, iodochloroxyquinoline, chlorohydroxyquinoline, 2-acetylamino-5-nitrothiazole and, more recently, 1-ethyl-3-(5-nitro-2-thiazolyl)urea.

The histomonastatic activity of these drugs greatly transcended their histomonacidal activity. Experimentation has shown that continuous feeding of these drugs to infected birds is necessary to keep the birds healthy and to prevent an occurrence or relapse of disease after withdrawal of the drug. Parasites which are embedded in tissues or deeply buried in crypts between the villi are apparently shielded from the action of drugs. Therefore, as long as drug is used as an additive to feed, the number of parasites is held to a nondisease-producing level but, as soon as the medicated mash is withdrawn, these parasites probably begin to multiply and in a few days reach a disease-producing proportion.

Often overlooked, in assessing the activity of particular drugs against pathogenic organisms, is the potential of that drug to destroy or control that organism under field conditions. In the laboratory, clean, healthy animals are utilized and a known amount of inoculum is employed; in fact, all conditions, including sanitation, are rigidly controlled. Under natural conditions, there is no way of knowing how many organisms are ingested. Stress factors, such as other parasites and disease organisms and vicissitudes of the weather, may change the picture. With blackhead, it is not only a case of unexpected things to confuse the picture, but a difference in the method of acquiring the parasite under the two environments.

The discovery that medication with certain drugs has an undesirable effect on egg production, egg quality, fertility, and hatchability is a second factor which has been frequently neglected in reports by investigators. Although certain drugs may be perfectly safe and well tolerated by young, growing birds, yet at the same or lower levels, they may be unsafe for adult birds because of their adverse effect on testicular activity and on production, quality, fertility, and hatchability of the eggs.

When embryonated cecal worm eggs are ingested by a susceptible bird, the larvae are liberated in the intestine at some distance anterior to the opening into the cecal pouches. This means that if Histomonas is present in these eggs, it must be carried into the ceca; how, is an unsolved question.

Bodies seen in the ovary and in the egg of the adult female worm were believed to be Histomonas,[41] but this has not been confirmed. That the Histomonas may enter the body of the developing embryo is not an unreasonable possibility. Should this be the case, this organism certainly would have a better chance to reach the cecum than if it were outside the protective body of the parasite embryo and dependent upon the food or intestinal fluids to carry it to the cecum.

The assumption that histomonads may be found in the body of Heterakis larvae has a few supporters. Histomonads have been found as intracellular parasites in the gut of the cecal worm.[52] Enterohepatitis has been produced by the intracecal inoculation of washed, infective larvae and by the intracecal inoculation of larvae that had been sterilized in hydrogen peroxide;[40]

and abnormalities in artificially hatched second-stage *H. gallinae* larvae, which may or may not have been due to Histomonas, have been observed.[6]

If histomonads enter the cecum via the cecal worm larvae, they would most likely be deposited in the tissues where they are protected against the action of any non-absorbed drug.

Investigators have repeatedly demonstrated that turkeys do not develop a strong immunity to blackhead; therefore, greater reliance must be placed on good management and chemotherapy.

It behooves the poultryman to thoroughly acquaint himself with practices which make for wholesome surroundings and good health for his birds, and which avoid unnecessary stresses which tend to lower resistance to disease. Chickens serve as carriers of histomonads—consequently, turkeys should not be raised in association with chickens or on ground used by the latter within at least two years.

Treatment as a means of controlling blackhead disease is not a substitute for good management. However, if management practices prove inadequate, it becomes necessary to resort to chemotherapy.

Blackhead is recognized only after the bird has been infected with the Histomonas for several days. By the time signs of the disease appear, it is often too late to expect much benefit from treatment. Therefore, it is necessary either (1) to feed the drug continuously as a prophylactic, or (2) to withhold treatment until the disease appears and then give the drug at a higher level for a few days, followed by the prophylactic level until marketing. The superiority of the continuous treatment has been generally recognized.

Phenothiazine has little or no effect on histomonads, but it is highly effective in removing the cecal worm which serves as a transmitting agent of Histomonas. Where blackhead disease exists, cecal worms usually exist also. To prescribe measures for the suppression of the Histomonas without taking similar precautions against the intake or removal of the cecal worm seems to be an inadvisable calculated risk.

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Newer Aspects of Zinc Metabolism

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ZINC IS generally recognized as an essential element in the metabolism of all vertebrates[1] and of many plants.[2] The earlier view was that neither deficiency nor toxicity occurred in farm animals fed normal rations and maintained under usual conditions.[10] Deficiency rations for mice were described as early as 1935.[8]

In 1953, it was suggested that swine parakeratosis was a nutritional deficiency disease[5] and, in 1955, that apparently zinc and calcium were involved; the amount of calcium present in the feed seemed to determine, or to relate to, the availability of zinc.[3,9]

Just recently, an informal discussion[4] among a group of research workers indicated that zinc may be a factor in a number of abnormalities observed in chickens.

SWINE TESTS

Until a few years ago, it was assumed that it would be exceedingly difficult to formulate a ration for farm animals capable of producing manifestations of zinc deficiency. The usual ingredients of the rations of pigs contain zinc in appreciable amount—upward of 30 parts per million (p.p.m.) of total ration.

When swine parakeratosis appeared,[5] several other possibilities were considered before the importance of zinc was established.[3,9] Since then, the metabolism of zinc and the interactions between zinc and various other minerals — major and minor — have been studied. The subject has been reviewed[6,7] and will not be repeated here.

The effect of supplemental zinc on pigs was tested at varying dosage levels, using rations with and without antibiotics. This latter variable was introduced because of the development of an antibiotic feed supplement (Baciferm*), in which the antibiotic bacitracin is stabilized by precipitating with zinc, and additional zinc required to insure complete precipitation is chemically bound to various protein fractions to form complex organic compounds.

Field tests showed that parakeratosis, which occurred spontaneously under farm conditions, responded equally well whether zinc was supplied in the antibiotic feed supplement or as zinc chloride. When either form (100 p.p.m. of total feed) was added to the deficiency ration, response was rapid and even dramatic.

Initial tests were designed to show that the antibiotic, as a zinc complex, is biologically available to chickens, turkeys, and pigs.

TABLE 1—Effect of Low Levels of Zinc

Antibiotic (Gm.)	Zinc° (p.p.m.)	No. pigs	Final weight	Daily gain	Feed per lb. gain
0	0	20	207	1.49	4.75
6	0	20	204	1.46	4.64
6	15	20	215	1.55	4.26
10	0	22	214	1.54	4.22
10	30	21	215	1.56	4.10

°In all instances, this represents supplemental zinc, the basic ration being formulated from natural feeds probably containing about 35 p.p.m. of zinc. Calcium levels were held at 0.83 per cent.

TABLE 2—Zinc Content of Pork Tissues

Antibiotic (Gm.)	Added zinc in feed (p.p.m.)	Zinc (μg./Gm.)	
		Liver	Muscle
0	0	83	20.0
6	0	337	19.0
6	15	320	20.1
10	0	296	19.2
10	30	No sample	31.2
1,000	3,000	315	17.1

A typical test provides the following data (table 1) in which no significant variations occur, except in the improved efficiency of feed utilization in the group fed the ration containing 10 Gm. of antibiotic and 30 p.p.m. of zinc. This indicates that the antibiotic was active and continued to exert the usual biological effect even though present as the stable zinc salt.

Liver and muscle were collected for zinc assay when the pigs had attained market weight. An unexpected and unexplained result was the high zinc content of the livers of all pigs fed antibiotics, regardless of zinc supplementation, and failure of the

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*Baciferm, containing zinc bacitracin, feed grade, is a product of Commercial Solvents Corp., Terre Haute, Ind.

TABLE 3—Effect of Supplemental Zinc

Antibiotic (Gm.)	Zinc added (p.p.m.)	No. pigs	Final weight	Daily gain	Feed per lb. gain
0	0	8	174.8	1.12	4.62
10	0	8	199.7	1.33	4.40
10	0	8	185.9	1.21	4.86
10	9	7	220.4	1.51	4.26
10	18	8	196.1	1.30	4.44
300	546	8	185.8	1.21	4.35

TABLE 5—Effect of Zinc on Swine Growth

Antibiotic (Gm.)	Zinc added (p.p.m.)	No. pigs	Average weight	Daily gain	Feed per lb. gain
0	0	6	207.8	1.48	4.55
10	0	6	204.5	1.45	6.04
10	0	6	207.7	1.48	5.30
10	0	6	200.8	1.42	4.62
10	15	6	221.1	1.61	4.34
300	450	6	210.7	1.52	4.88

muscles to follow this pattern (table 2). Even the amounts of zinc found in the livers were regarded as being well within the range of safety for human consumption.

In another test, a similar series of data were collected but were amplified by examination of the blood and by zinc assay of the tissues at the time of slaughter. The findings show that the bacitracin was available, although present in the feed as the zinc salt (table 3). Again, no value is shown for added zinc, since no deficiency existed.

Blood films were prepared from each pig, at the time of slaughter, and showed a normal number of leukocytes of each type on a differential count. For each group of pigs, the variations within the group were within the normal range (table 4).

Still another test was conducted, using six groups of 6 pigs each. Three antibiotics were used, of which only one was zinc-stabilized bacitracin. It was fed at low (10 Gm.) level, and at high (300 Gm.) level; the high level was no more effective than the low. However, both groups fed the zinc-containing antibiotic feed supplement grew exceptionally rapidly and used feed efficiently (table 5).

Samples of blood, liver, muscle, and bone were collected when the pigs reached market weight. Only bone appeared to store zinc in this series of animals. None of the edible tissues, not even the liver, contained more than the normal amount of zinc (table 6). We have no explanation for the wide difference in amount of zinc in the livers of pigs in the first and second tests.

TABLE 4—Differential Leukocyte Count in Pigs

Antibiotic (Gm.)	Zinc added (p.p.m.)	Lymph.* (%)	Mono.* (%)	Baso.* (%)	Eosin.* (%)	Neut.* (%)
0	0	0.88	3.06	33.69	60.44	1.56
10	0	0.69	4.13	21.31	73.13	0.88
10	0	0.81	4.44	23.00	69.30	0.56
10	9	0.86	4.21	33.07	60.79	0.29
10	18	1.00	5.19	31.69	60.56	1.25
300	546	1.31	4.00	30.31	64.44	0.19

*Baso. = basophils; eosin. = eosinophils; neut. = neutrophils; lymph. = lymphocytes; mono. = monocytes.

SUMMARY OF SWINE TESTS

1) Zinc was biologically available when supplied in an antibiotic feed supplement in which some zinc was chemically bound to the antibiotic and some was present in complex organic compounds.

TABLE 6—Effect of Zinc on Pork Tissues

Antibiotic (Gm.)	Zinc added in feed (p.p.m.)	Zinc (μg./Gm.) Blood	Bone	Liver	Muscle
0	0	11.0	44.25	28.45	79.56
10	0	12.46	43.70	28.82	65.22
10	0	10.46	37.50	27.20	59.56
10	0	12.45	41.88	26.88	77.18
10	15	11.46	52.70	25.31	87.41
300	450	11.20	68.45	26.32	76.11

2) Zinc was not stored in edible pork tissues, even when supplemental amounts were fed to supply 450 p.p.m. of total ration.

3) Zinc supplementation had no effect upon the blood picture, insofar as this was mirrored by a differential leukocyte count.

4) This feed supplement, in which the antibiotic bacitracin was stabilized by precipitating with zinc, when fed at moderate levels appeared to have a favorable effect upon the efficiency of feed utilization and upon rate of growth of swine. In other words, the response to the antibiotic was not lost because it was chemically bound with zinc.

POULTRY TESTS

The effect of supplemental zinc on poultry was tested at varying levels. Again, an antibiotic was used in rations with and without zinc.

The early tests were designed to determine the effect of increasing amounts of supplemental zinc on growth. The antibiotic feed supplement was used as a source of zinc, except in the final group,

TABLE 7—Effect of Zinc on Growth of Chickens

Antibiotic (Gm.)	Zinc added (p.p.m.)	Wt. (Gm.) at 69 days	Feed per lb. gain	Response over controls (%)
0	0	1,394	2.45	0
25	30	1,466	2.34	5.2
50	60	1,436	2.40	3.0
100	120	1,462	2.36	4.9
200	240	1,444	2.40	3.6
400	480	1,461	2.38	4.8
500	600	1,451	2.36	4.0
750	900	1,429	2.42	2.5
1,000	1,200	1,428	2.49	2.4
1,000	88	1,461	2.36	4.8

TABLE 8—Effect of Zinc on Growth of Chickens

Antibiotic (Gm.)	Zinc added (p.p.m.)	Wt. (Gm.) at 70 days	Feed per lb. gain.
0	0	1,384	2.61
25	46	1,426	2.50
50	91	1,445	2.57
100	182	1,426	2.46
200	365	1,443	2.53
400	729	1,448	2.42
500	911	1,489	2.42
750	1,367	1,424	2.51
1,000	1,823	1,296	2.61
1,000 (pharm. grade)	88	1,429	2.54

where a pharmaceutical grade of zinc bacitracin was used. Every supplemented group surpassed the controls, with a trend indicating that full growth response was attained until the zinc content approached 1,000 p.p.m. The data (table 7) suggest that the antibiotic was available to the chickens, while the zinc showed no detrimental tendency up to about 900 p.p.m.

A subsequent test, similar in nature, included an experimental antibiotic feed supplement having a somewhat greater zinc content. As with pigs, a trend was observed (table 8) toward more efficient feed utilization and more rapid growth, indicating that the antibiotic present was available and that zinc was not harmful until the ration was supplemented with approximately 900 p.p.m. of zinc.

When the zinc bacitracin (feed grade) was fed to a group of commercial broilers, the antibiotic response was equally favorable (table 9) until the zinc supplementation reached 240 p.p.m.

White Rock hens in three pens were fed and observed for 11 months. The hens in all pens had the same basal ration, but one group was given unsupplemented feed, another had 100 Gm. of antibiotic in a feed supplement, and the third had 100 Gm. of the zinc-precipitated antibiotic feed supplement, which supplied 180 p.p.m. of zinc.

Differential leukocyte counts were made, and all types remained within the normal range (table 10).

Eggs were collected and assayed for zinc, but showed no significant alteration from the normal in zinc content of the albumen, the yolk, or the shell, even after feeding for 182 days (table 11).

All eggs not used for zinc assay were collected for hatching, and the results of this test (table 12) show no significant effect from either antibiotic or zinc.

Feces collected under the dropping boards were also assayed for zinc (table 13). Although it is difficult to draw an accurate comparison between zinc ingested in the feed and that excreted in the feces, it would appear that essentially all of the supplemental zinc appeared in the feces.

Upon completion of the laying season, tissues were gathered at necropsy to study the zinc content. Blood, liver, muscle, and bone were ashed and assayed. Again, as with swine (table 6), an unexpected and unexplained result was a bone assay in the antibiotic-fed group which parallels that of the zinc-supplemented group (table 14). Here the difference is much less pronounced and, in fact, lies within the normal range.

TABLE 9—Effect of Zinc on Commercial Broilers

Antibiotic (Gm.)	Zinc added (p.p.m.)	No. birds	Average Wt. (lb.)	Feed per lb. gain
4	0	3,569	2.94	2.74
50	60	2,450	3.13	2.68
100	120	3,570	2.99	2.67
200	240	2,640	3.04	2.82

Two tests were conducted with chickens to determine if zinc, supplied as part of a complex organic compound, differed in its effect from zinc supplied as the chloride. In the first test (table 15), at

TABLE 10—Differential Leukocyte Counts in Hens

Antibiotic	Zinc added (p.p.m.)	Basophils		Eosinophils		Heterophils		Lymphocytes		Monocytes	
		Range	Av.	Range	Av.	Range	Av.	Range	Av.	Range	Av.
0	0	2-5	3.0	0-10	3.25	26-39	33.0	50-57	53	4-8	5.5
100	0	1-4	2.6	1-10	4.25	20-33	26.8	54-65	59	5-9	7.4
100	180	2-4	2.5	2-10	6.00	16-49	29.5	43-63	55	1-11	5.6

TABLE 11—Zinc Content of Eggs

Zinc added in ration (p.p.m.)	Zinc (μg./Gm.)		
	Albumen	Yolk	Shell
0	0.0	1.9	2.0
180	0.4	1.1	2.0

3,000 p.p.m. of the total ration, both forms of zinc caused a regression in growth, as compared with the control birds. The regression was much more marked in the zinc chloride group. Palatability of the feed appeared to be an important factor, especially with the ration containing zinc chloride.

In the second test (table 16), zinc was added to the ration at the rate of 1,000 and 2,000 p.p.m., using proteinate, carbonate, and acetate. The antibiotic levels in all except control rations were kept constant.

TABLE 13—Zinc Content of Feces of Chickens

Ration		Feces
Antibiotic (Gm.)	Zinc added (p.p.m.)	Zinc (μg./Gm.*)
0	0	170
100	0	129
100	180	316

*The figures are not based on a full day's excrement.

The results indicate no significant differences between the effect of zinc proteinate, zinc carbonate, and zinc acetate.

SUMMARY OF POULTRY TESTS

1) The antibiotic, bacitracin, is biologically available to chickens when added to the ration as a feed supplement in which the bacitracin has been stabilized with zinc.

2) Zinc is not concentrated in the eggs or in the edible tissues of the body, but excessive amounts are eliminated in the feces.

3) Zinc supplementation has no recognizable effect upon the differential leukocyte count.

4) Zinc supplementation of practical rations at moderate levels with zinc bacitracin, feed grade, appears to have a favorable effect upon the efficiency of feed utilization and upon rate of growth, suggesting that the antibiotic present is biologically available. Both advantages are lost when the rate of supplementation approaches 1,000 p.p.m. of total ration.

TABLE 12—Effect of Zinc on Eggs

Ration		Egg production (%)	Hatchability (%)	
Antibiotic (Gm.)	Zinc added (p.p.m.)		Fertile	All eggs
0	0	53.7	87.4	76.1
100	0	47.3	89.4	79.6
100	180	51.0	88.2	75.1

POULTRY DEFICIENCIES

At the 1957 meeting of the Poultry Science Association, a group of workers discussed zinc deficiencies in birds consuming rations presumed to be normal and complete. Attention has been focused on this subject by the more precise analytical methods available and the basic realization that zinc is essential for the proper functioning of several enzyme systems; and that these, in turn, determine the efficient utilization of nutrients by the body.

TABLE 14—Zinc Content of Tissues

Ration		Zinc (μg./Gm.)			
Antibiotic (Gm.)	Zinc added (p.p.m.)	Blood	Bone	Liver	Muscle
0	0	24.4	106.1	40.1	11.1
100	0	19.4	135.1	43.0	19.7
100	180	26.1	130.6	37.4	15.0

A number of abnormalities were mentioned, and attention was directed toward an interaction between zinc and several other minerals—major and minor. The possible or probable effects on the functioning of specific enzyme systems was not discussed; neither was the manner or pathway through which a deficiency of zinc might interfere with the utilization

TABLE 15—Zinc Proteinate Versus Zinc Chloride in Chickens

Zinc added (p.p.m.)		Weight (Gm.)	Feed per lb. gain	Response over controls (%)
Proteinate	Chloride			
0	0	1,470	2.65	—
30	0	1,519	2.60	3.3
300	0	1,557	2.33	5.9
3,000	0	1,213	2.72	−17.3
0	3,000	1,026	2.90	−30.2

TABLE 16—Zinc Proteinate Versus Zinc Salts in Chickens

Added zinc (p.p.m.)			Sexed wt. (Gm.) at 71 days	Response over control (%)
Acetate	Carbonate	Proteinate		
0	0	0	1,626	—
1,000	0	0	1,639	0.8
0	1,000	0	1,600	−1.6
0	0	1,000	1,536	−5.5
2,000	0	0	1,535	−5.6
0	2,000	0	1,548	−4.8
0	0	2,000	1,505	−7.5

of nutrient substances provided by the feed.

A tendency for the long bones—especially the femur and tibia—to become short, thick, and flat, rather than retain their normal long, slender, round, and firm characteristics, had been observed in chickens fed rations containing as little as 15 p.p.m. of zinc. Supplemental zinc seemed to reduce the incidence or prevent the condition.

The feathers of certain lots of chickens and turkeys were straggly and unkempt. Their rations proved to be low in zinc. Microscopic examination of the feathers showed that the barbs developing on each side of the shaft or quill to form the vane were abnormal. They did not develop the tiny barbules which normally interlock to keep the feathers orderly and smooth. When supplemental zinc was added to the ration, the incidence of the condition was reduced, or it disappeared completely. Whether this is related to the hairy-turkey condition sometimes observed was not established.

Hock enlargement in turkeys was produced consistently when a ration containing 2 per cent calcium was fed. The swelling was readily observed at the age of 1 week. At 2 weeks, some birds had recovered while others were more severely affected. This trend persisted—some birds recovered with age while others were affected with more prominent lesions. Zinc supplemented at the rate of 0.58 per cent (5,800 p.p.m.) did not completely correct the condition. The interaction of manganese in this connection was not discussed.

Dermatitis developed on the feet and legs of turkeys. This sometimes responded to supplemental zinc and consistently responded when wheat was added to the formula to constitute 15 to 20 per cent of the ration. The question of a concurrent selenium imbalance is raised.

The zinc content in normal feed ingredients varies widely, so that results and conclusions from previously reported tests should be re-examined. Even the purified proteins may contain as much as 27 p.p.m. of zinc, of which only 12 p.p.m. remains after careful washing.

The type of equipment used to house, feed, and water the birds can be highly important—the use of plastic or stainless steel throughout may result in a response which varies widely from that obtained when the usual galvanized metal cages, feeders, and fountains are used with birds from the same hatch and eating the same ration.

Supplemental zinc resulted in a favorable response when used with a ration devoid of fish proteins, but failed when the same type of ration contained fish. This raises the question of zinc being at least a part of the inorganic or ash unidentified growth factor.

Zinc toxicity also deserves attention. One experimental group is working with levels of zinc which are recognizably toxic to swine. Other groups may be conducting similar experiments.

Many questions remain unanswered, but the growing importance of zinc and other micro-minerals in rations is recognized, and definitive answers are developing.

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A Chick Growth Factor in Egg Yolk.—An unidentified chick growth factor, known to be present since 1954, has been extracted from dried yolk by common fat solvents. It is not identical with the fish soluble factor since the latter is water soluble. —*J. Nutr. (Dec., 1957)*: *499 (abstr. in Feed Bag, March, 1958, p. 35)*.

American Animal Hospital Association Twenty-Fifth Anniversary

In 1928, while addressing the meeting of the American Veterinary Medical Association in Minneapolis, Dr. J. V. Lacroix emphasized that the hospitalization of pet animals was a new phase of veterinary practice. He urged that an organization composed of small animal hospital directors be developed, which would encourage the best possible service and hospital facilities for the care and treatment of dogs, cats, and other pets.

The interest that Dr. Lacroix aroused in the formation of such a group resulted in a meeting of pet animal practitioners in August, 1933, to explore the possibilities. Although much was accomplished from the exchange of ideas, an organization was not formed at that time. However, seven of that group met again in Chicago in November of that year and succeeded in drafting the constitution and bylaws which established the American Animal Hospital Association. The first officers, chosen from those attending, were: Drs. Mark L. Morris, president; Donald A. Eastman, vice-president; Arthur R. Theobald, secretary-treasurer; while Louis H. LaFond, J. M. McKenna, J. V. Lacroix, and S. W. Haigler made up the executive board. The first annual meeting was held in Cincinnati, Ohio, April 20 and 21, 1934.

In a quarter of a century, the Association has grown from a nucleus of seven hospitals and seven men to 370 hospitals, where about 1,200 veterinarians are engaged primarily in pet practice.

The annual association meeting features demonstrations and dissertations which present the latest information on surgery, medicine, and care of pet animals. In 1952, with the assistance of Pitman-Moore Co. and RCA, the program was expanded to include closed-circuit television. The convention, which extends over a four-day period, has an annual attendance of over 800 persons. Regional meetings, in addition to the annual meeting, provide for an "off-the-cuff" exchange of ideas on how to conduct a practice and operate a hospital.

Since this is an association of hospitals, improved hospital management is one of the major projects of the association. Approximately 70 per cent of the member hospitals and at least an equal number of nonmember hospitals are visited annually by an official representative of the association. The purpose of this inspection is to encourage improvement in practice methods, in physical plants, and in hospital management.

The association's progress has been accelerated by the unselfish efforts of the various committees. Each year has seen new committees added to the scope of endeavor. For the year 1958-1959, there will be five standing committees and 23 special committees. Their projects cover a variety of activities—from record keeping and office management to practice.

Professional ethics and planning for the future have been given special emphasis. In 1949, Dr. Lloyd C. Moss, Colorado State University, who then operated a small animal hospital in Hawaii, saw the need for better indoctrination of students in professional conduct. To stimulate interest in this field, he financed an essay contest on veterinary ethics. Each year, many of the senior students at our veterinary colleges participate in this contest.

Directors of hospitals have been encouraged to cooperate with teachers and students of the veterinary schools. Provisions are made at most hospitals for unofficial internships for graduating seniors and summer employment for undergraduates. The system of tutorships has done much to guide and stimulate new graduates to become better practitioners.

From an exchange of ideas in committee work, new concepts have been developed for practice methods and desirable hospital construction. These, together with representative sets of hospital plans, have been published in a book, "Planning Your Animal Hospital," which is designed to assist and foster a wise, practical building program for the hospital owner. As an added service, the association is in a position to recommend a consulting engineer who has a wide variety of experience in planning and building veterinary hospitals.

The JOURNAL extends its warmest congratulations to the members of the A.A.H.A. on this, their twenty-fifth anniversary (which was commemorated April 23-26, 1958, Chicago), with confidence that the next quarter century will bring even greater advancement.

Current Literature

ABSTRACTS

Intraocular Tumors in Animals

The authors reviewed the literature on tumors arising from intraocular structures and tabulated reports on horses, cattle, sheep, dogs, cats, fish, a rabbit, and a hen. Their own material consisted of 15 cases of intraocular tumors in dogs, of which 11 were malignant melanomas of the uvea and 4 epithelial tumors of the ciliary body or iris. The latter do not metastasize, but the melanomas in some cases extended to the orbit, along the optic nerve to the brain, or metastasized to distant organs. Glaucoma had been recognized clinically in 5 of the 15 cases, so that this sign is useful in raising the suspicion of intraocular neoplasia during examination.

The clinical history and histopathology are given separately for each of the 15 cases reported, and the criteria for diagnosis and prognosis are outlined.—[*L. Z. Saunders and C. N. Barron: Primary Pigmented Intraocular Tumors in Animals. Cancer Res., 18 (Feb., 1958): 234-245.*]

Postparturient Bovine Uterine Motility

Rates of uterine contractions during the puerperium were recorded by an intrauterine balloon technique. Average rates in normal dairy cows were 14 per hour at the onset and less than one per hour after the forty-eighth hour. The amplitude of these contractions decreased in proportion to the rate. Increased uterine motility accompanied nursing in 2 of 6 normal cows.

Experimental retention of fetal membranes was produced in 6 dairy cows by ablation of the corpora lutea after the two hundredth day of gestation. Rates of uterine contractions during the puerperium averaged 19 per hour throughout a three-day period. Abnormalities in the contraction patterns included tetanic contractions and secondary superimposed undulations.—[*John H. Venable and L. E. McDonald: Postparturient Bovine Uterine Motility—Normal and After Experimentally Produced Retention of the Fetal Membranes. Am. J. Vet. Res., 19, (April, 1958): 308-313.*]

Vaginal Cytology of the Ewe

Vaginal smears taken daily from 2 virgin Columbia ewes during an entire normal estrous cycle were stained by the Papanicolaou method. In proestrus, smears were thin, mucus was clear, and cells were single, few in number, and basophilic. In estrus, the smear was thin, mucus was clear, and cells were few in number. About two thirds of these were basophilic and the remainder were eosinophilic (cornified).

During metestrus and diestrus, the vagina was dry and masses of cells, bacteria, leukocytes, and detritus were present. Almost all the cells were cornified, clumped together, and tended to pile up.

The phases of the normal estrous cycle of the ewe can be readily followed by studying the gross and microscopic characteristics of the vaginal smear.—[*V. L. Sanger, P. H. Engle, and D. S. Bell: The Vaginal Cytology of the Ewe During the Estrous Cycle. Am. J. Vet. Res., 19, (April, 1958): 283-287.*]

Nematocidal Activity of Phosphorus Compounds

Screening tests for nematocidal activity against horse strongyle larvae *in vitro* were carried out on 173 organic phosphorus compounds of 26 types. Of these, 39.8 per cent showed some activity at a concentration of 0.01 M or lower. The most active compounds and the concentrations at which they killed or prevented the development of all larvae were 0-(2-chlorovinyl)-0,0-dimethyl phosphate (0.001 M); 0-(2-chlorovinyl)-0,0-dipropyl phosphate (0.0001 M); 0-(2,2-dichlorovinyl)-0,0-diethyl phosphate (0.00005 M); 0-(2,2-dichlorovinyl)-0,0-dipropyl phosphate (0.00005 M); 0-(2,2-dichlorovinyl)-0,0-diisopropyl phosphate (0.001 M); 0-(2,2-dichlorovinyl)-0,0-dibutyl phosphate (0.00025 M); 0-(2,4,5-trichlorophenyl)-0,0-diethyl phosphate (0.0005 M); 2,2,2-trichloro-1-hydroxyethyl-0,0-dimethyl phosphonate (Dipterex) (0.0001 to 0.00025 M); 4-oxo-penten-1-yl-0,0-diethyl phosphonate (OS 1808) (0.00005 M); triphenylmethyl phosphonium iodide (0.0005 M); and 0,0,0-tri-(*n*-propyl) phosphorotrithioite (0.00025 M).—[*Norman D. Levine, Sidney Kantor, and Gale D. Taylor: Nematocidal Activity of Some Organic Phosphorus Compounds Against Horse Strongyle Larvae in Vitro. Am. J. Vet. Res., 19, (April, 1958): 299-303.*]

Antibody Response to Dictyocaulus Viviparus Infection

Complement-fixation responses of calves initially infected with *Dictyocaulus viviparus* and of calves once re-exposed to infection with this parasite did not differ significantly. The interval between exposure or re-exposure to infection and the initial rise in titers was about 12 days; about four days later, the response reached a peak. The titers remained near the peak level about 48 days in both groups.

Nine weeks or longer after being given infective larvae, animals which had been passively immunized showed the lowest antibody response; repeatedly challenged animals showed the greatest response; and other animals initially infected and those re-exposed once showed intermediate titers.

No relationship was apparent betweeen the complement-fixing antibody response of initially infected calves, their ages when infected, the number of larvae administered, the number of first-stage larvae eliminated in their feces, or the severity of the clinical response.—[*Thomas B. Weber: The Complement-Fixing Antibody Response of Cattle Infected or Exposed to Reinfection with Dictyocaulus Viviparus. Am. J. Vet. Res., 19, (April, 1958): 338-344.*]

The Pharmacology of Sulfabromomethazine

The absorption, distribution, excretion, and toxicity of sulfabromomethazine was studied in dairy calves and cows following the oral, intraperitoneal, and intravenous administration of doses of 214 mg. per kilogram of body weight. The resulting whole blood levels were maintained at accepted therapeutic concentrations for approximately 40 to 48 hours after these doses. The degree of acetylation in blood was 12 per cent while, in urine, it ranged from 41 to 85 per cent of the total sulfonamide present. Plasma levels were about 10 per cent higher than the concurrent blood concentrations. Cerebrospinal fluid and milk levels were about 10 per cent and 20 per cent of the corresponding plasma and whole blood levels, respectively. The apparent volume of distribution was 40 per cent of body weight.

Urinary excretion of the drug was gradual, and the greatest increments in cumulative excretion corresponded to the period of most rapid decline in blood levels. Some 75 per cent of the administered dose was accounted for in the urine over a period of six days. On intravenous administration, an acutely toxic syndrome was seen, characterized by ataxia, excitement, and temporary collapse. Limited chronic toxicity trials and limited clinical trials suggest further clinical investigation in cattle.—[*C. M. Stowe, A. L. Aronson, and K. Johnson: The Pharmacology of Sulfabromomethazine, a New Long-Acting Sulfonamide, in Cattle. Am. J. Vet. Res., 19, (April, 1958): 345-353.*]

Klossiella Equi in a Zebra

Four morphological stages (uninuclear, multinuclear, budding form, and oocyst with spores) in the sporogonic cycle of *Klossiella equi* are illustrated and described. The parasites were localized within lining epithelial cells in the tubules of the thick limb of Henle's loop, situated in the renal medullary rays.—[*J. W. Newbern, V. B. Robinson, and N. E. Bowen: Histological Aspects of Klossiella Equi in the Kidney of a Zebra. Am. J. Vet. Res., 19, (April, 1958): 304-307.*]

BOOKS AND REPORTS

Veterinary Meat Inspection

The fifth edition of this important book has been essentially revised and extended, especially the chapters dealing with the development and prevention of meat poisoning and that describing the act of examination and judging of slaughtered tuberculous animals.

Other chapters deal generally with the meat inspection of cattle, calves, pigs, sheep, goats, horses, and dogs. The legal regulations described in the publication are, of course, discussed with regard to the laws valid in Germany.

The entire book has been written clearly and supplemented by instructive illustrations. It may serve as a good source for meat inspectors and also for the student of veterinary medicine.—[*F. Schönberg and O. Zietzschmann: Tierärztliche Fleischuntersuchung (Veterinary Meat Inspection). 5th ed. 343 pages; 189 illustrations (8 in color). Paul Parey, Berlin, Germany. 1958. Price about $10.*]—F. KRAL.

The Golden Egg—An Autobiography

This is the life story of the author, Dr. Arthur D. Goldhaft, who tells in a most interesting fashion of his early boyhood in Philadelphia, his family's struggles for a living, how he did odd jobs to earn money for an education and was finally able, through attendance at the first vocational agricultural school in America—the Baron de Hirsch School in New Jersey—to qualify for admission to the veterinary school at the University of Pennsylvania from which he received his degree in 1910.

It is also the story of the first veterinarian to specialize in poultry practice and how this led to the establishment of facilities for research in poultry diseases and for the production of biological products to combat those diseases, including pioneer work in the egg-propagation of viruses for production of vaccines, not only for animals but also for human beings. Also told are the developments in the breeding and raising of chickens which have had such an impact on that industry that chicken is no longer just a "Sunday dinner" treat but an everyday food item.

All in all, "The Golden Egg" is a story of people and of preventive veterinary medicine; a characteristically American story of an eventful and highly productive life.—[*The Golden Egg—An Autobiography. By Arthur D. Goldhaft, V.M.D., with an introduction by Meyer Levin. 314 pages. Horizon Press, New York, N. Y. 1957. Price $5.00.*]—J. G. HARDENBERGH.

Surgeons All

The story of surgery from the the first trepan operation by a Neolithic surgeon to the delicate heart operations by modern-day surgeons makes fascinating reading for persons interested in medicine. The author uses a lively style and a sense of humor in telling of the growth of surgery as a special branch of medicine, but conveys the historical significance and the drama of events as well. He tells of such things as the long struggle against Galenism, the opposition of physicians who refused to admit that surgery was anything but a barber's skill, the difficulties of obtaining corpses for study during the Middle Ages, the lives of Harvey, Hunter, and many other men, and the advances and retrogressions of surgery as a science up to just before World War II. In this, the second edition, the author comments on several errors and oversights and adds a postcript, bringing the story of surgery up to 1956.—[*Surgeons All. By Harvey Graham, M.D. 459 pages. 29 illustrations. Philosophical Library, Inc., 15 East 40th St., New York 16, N.Y. 1957. Price $10.00.*]

THE NEWS

World Health Assembly to Meet in Minneapolis

The United States is the host for the first time to the World Health Organization (WHO) which will convene in Minneapolis on May 26, 1958, to begin its annual meeting with a special tenth anniversary session of the World Health Assembly.

WHO came into being in September, 1948, following ratification, by 26 member countries of the United Nations, of a proposed constitution for the new agency which was presented at an International Health Conference in New York in 1946. It is now a body representing 88 countries and its purpose is to coordinate international health work and to assist governments, on request, in strengthening their health services. Its objective is the highest possible level of health for all peoples.

From previously existing organizations, WHO inherited international duties relating to epidemic control, quarantine measures, standardization of drugs, and so on. It has expanded these services by operating a warning system to health administrations of the occurrence of epidemic disease anywhere in the world; by setting up universally accepted health regulations governing international travel and trade; by publishing an international pharmacopoeia, and through technical publications on a wide variety of health subjects.

Sessions of the World Health Assembly will be held in the Leamington Hotel, the Minneapolis Municipal Auditorium, and in the auditorium of the Minneapolis Vocational High School.

Dr. A. H. Davidson Elected President of Thoroughbred Club

Dr. Arthur H. Davidson (ISC '36), a member of the veterinary partnership of Hagyard, Davidson and McGee, of Lexington, Ky., was recently elected president of the Thoroughbred Club of America. He succeeds Mr. Clarkson Beard who will become a member of the club's board of directors.

Dr. Davidson's election as head of T.C.A. follows previous service on its board of directors and as vice-president last year. The club, which was founded in 1932, now has over 750 members. The late Dr. E. W. Hagyard (ONT '88) and his son, Dr. Chas. E. Hagyard (ONT '24), were among the 15 charter members, the former having been honorary vice-president for several years prior to his death in August, 1951. Dr. Charles Hagyard was T.C.A. president in 1944-45 and a member of its board of directors for many years.

Among other directors named to the ten-man board is Dr. Horace N. Davis (OSU '48), also of Lexington, and immediate past-president of the American Equine Practitioners Association.

AMONG THE STATES AND PROVINCES

Alabama

Alabama Auxiliary.—The tenth annual meeting of the Women's Auxiliary to the Alabama Veterinary Medical Association was held at the Hotel Stafford, Tuscaloosa, on March 17, 1958.

The new officers are (left to right)—Mrs. C. G. Peacock, vice president; Mrs. Joe L. Sledge, Greensboro, retiring president; Mrs. J. W. Hazelrig, president; Mrs. T. M. Miller, secretary-treasurer; and Mrs. R. O. Moore, Jr., historian.

Mrs. Joe L. Sledge, president, of Greensboro, presided over the business session and introduced a special visitor, Mrs. Lewis W. Moe of Stillwater, Okla., president of the Women's Auxiliary of the AVMA, who spoke on auxiliary affiliations.

It was voted to contribute $5 to the AVMA Research Fund, $5 to the Women's Auxiliary Student Loan Fund, $25 to the I. S. McAdory Memorial Award for an outstanding freshman veterinary student at A.P.I., $25 for a new award to be called the "R. S. Sugg Memorial Award" for the freshman veterinary student at A.P.I. with the highest scholastic average, and $5 for an award to the outstanding member of the Women's Auxiliary of the AVMA student chapter at A.P.I.

It was also voted to write Dr. Alexander Sas Jaworsky of Abbeville, La., a letter of commendation for his fine performance and great success on the "$64,000 Question" television program recently.

Mrs. T. C. Fitzgerald of Auburn reported on the AVMA Auxiliary annual meeting in Cleveland last August and was appointed by the president to serve for this year as a dele-

gate to the meeting in Philadelphia. She also reported on the student chapter auxiliary at A.P.I.

The following new officers were installed by Mrs. Moe: Mrs. J. W. Hazelrig, Birmingham, president; Mrs. C. G. Peacock, Eutaw, vice-president; Mrs. T. M. Miller, Dothan, secretary-treasurer; Mrs. R. O. Moore, Jr., Tuscaloosa, historian.

The 1959 meeting will be held in Dothan.

s/MRS. C. G. PEACOCK, *Secretary.*

Arizona

New Officers.—The new officers of the Southern Arizona Veterinary Medical Association are Drs. W. K. Lee, Tucson, president; C. E. McGlamery, Tucson, vice-president; Gwyn Chapin, Tucson, secretary-treasurer.

s/GWYN CHAPIN, *Secretary-Treasurer.*

California

New Officers.—The new officers of the Orange County Veterinary Medical Association are Drs. Harlan M. Stanton, 1192 Laguna Road, Tustin, president; Richard A. Shea, 125 Mesa Drive, Costa Mesa, vice-president; Paul T. Wise, 1729 N. Grand Ave., Santa Ana, secretary-treasurer.

s/PAUL T. WISE, *Secretary-Treasurer.*

Delaware

New Castle County Association to Sponsor Symposium on Chemotherapy.—A symposium, "New Horizons in Chemotherapy," will be held at the Hotel Dupont, Wilmington, on June 5 under the sponsorship of the New Castle County Veterinary Association. Topics to be discussed under the general heading of "Nitrofurans in Veterinary Medicine" include etiology and therapy of urinary tract infections, tracheobronchitis and diarrhea in dogs, mastitis, calf scours, bacterial sensitivity testing, and hospital management.

Veterinarians wishing to attend should contact Dr. Morris S. Cover, University of Delaware, Newark, president of the association. There will be no registration fee.

District of Columbia

Joint Conference of District of Columbia Academy of V.M. and A.A.H.A.—On February 27, this group met for an all-day meeting with an attendance of over 200 veterinarians. Intense interest was shown in the program which included "Problems of the Modern Animal Hospital" as well as scientific papers.

Dr. Joseph Millar, president of the A.A.H.A., welcomed the conference. Dr. Charles Bild, Miami Beach, Fla., spoke on "Electrolytes" and Dr. Mark Morris, Topeka, Kan., on trends in veterinary hospitals.

Panel discussions were held on: noise factors, acoustics, exercise runs, sewage, and insect control.

Dr. J. T. Wittig, Portsmouth, Va., talked on "Controlling Insects on the Premises" while Dr. Harold Cooper, Roanoke, Va., spoke on "Insects Within the Hospital." The problem of sewage was ably covered by the president of the academy, Dr. H. C. Newman. An interesting talk by Dr. G. E. DeCamp, New York City, on geriatrics closed the morning session.

At the afternoon session, Dr. William F. Hoffman, Pittsburgh, Pa., showed a movie on, and discussed, heart surgery. This part of the program was followed by a lucid and realistic talk, by Dr. Robert Knowles, Miami, Fla., on hospital management. Drs. Bryant C. Vinson, Baltimore, Md., and Robert L. Ticehurst, Red Bank, N. J., discussed "Ventilation and Odors" and "Air Conditioning." Dr. Harold Melman, Washington, D. C., discussed "Modern Methods of Incineration" and Dr. William Gay, of the National Institute of Health, covered "Acoustics." Dr. Milton Sause talked on "Inside Exercise Runs."

The chairman of the morning session was Dr. E. Ruebush and of the afternoon session, Dr. R. Curry, both of Washington, D. C. The program was arranged by Dr. Harold Melman for the Academy of Veterinary Medicine.

s/A. BUDD FENTON, *Secretary.*

Idaho

Southwest Idaho V.M.A.—The Southwest Idaho Veterinary Medical Association met on March 6 at Nampa, to honor Dr. F. F. Fischer, veterinarian in charge, and Dr. W. A. Bright, assistant veterinarian in charge, of the Animal Disease Eradication Division, U.S.D.A., Boise, who were retiring.

Dr. Kenneth R. Hoyt, the new assistant veterinarian in charge, was introduced. A short review of the recent short course at Colorado State University was given by Dr. C. I. Manners. Dr. Orville L. Frost, Caldwell, presented a report on mastitis and improper operation of the milking machine.

New officers elected are Drs. W. K. Goering, Nampa, president, and M. Inverso, Boise, secretary-treasurer.

s/MICHAEL INVERSO, *Secretary.*

Illinois

Radiology in Veterinary Medicine.—Ten Wednesdays, which began on April 12, will be devoted primarily to practical aspects of diagnostic x ray. The course will be conducted by members of the Radiology Department of the Cook County Hospital. Theory and basic methods will be discussed, including protection against radiation hazards. The areas of study will include fractures, the skeletal system, chest, head, neck, abdomen, and tissues.

Indiana

The Veterinarian and Public Health.—A public health conference, sponsored jointly by the Indiana Veterinary Medical Association and the Indiana State Board of Health, was held at the Indiana State Board of Health offices in Indianapolis on March 27, 1958. Ninety-five registered from over the state.

Drs. J. D. Salisbury of Indianapolis and L. W. Hinchman of Glenwood were co-chairmen of the conference program.

Dr. L. A. Barnes, Rockville, was chairman of the morning session, which opened with a welcoming address by Dr. A. C. Offutt, (M.D.), state health commissioner, Indianapolis. Dr. J. H. Steele, chief of the veterinary section of the Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga., spoke on the veterinarians' responsibilities in public health, followed by a discussion of veterinary activities in a local health department by Dr. K. V. Shashek, of St. Louis, Mo.

At the afternoon session, Dr. S. P. Williamson of South Bend acted as chairman. Dr. F. N. Andrews (Ph.D.), professor of animal husbandry, Purdue University, discussed the role of antibiotic feed additives and steroids in public health; virus diseases of animals transmissible to man was covered by Dr. A. L. Brueckner, director of the Livestock Sanitary Service Laboratory, College Park, Md.

Two speakers of the Veterinary Corps, U. S. Army, Lt. Colonel L. E. Murphy and Lt. Colonel W. E. Rothe, spoke on "Newer Knowledge of Leptospirosis and the Leptospiras" and "Radiation Aspects of Veterinary Public Health," respectively. These talks were followed by "Speakers on the Firing Line"—a panel participated in by all of the conference speakers.

Dr. J. H. Steele concluded the program with slides and comments on his recent trip to a World Health Organization meeting in Warsaw, Poland.

s/L. M. BORST, *Secretary*,
Indiana V.M.A.

Ohio

New Officers.—The new officers of the Cincinnati Veterinary Medical Association are Drs. K. S. Grady, Cincinnati, president; J. A. Wiley, Cincinnati, vice president; M. J. Cain, Cincinnati, secretary; James Auvil, Cincinnati, treasurer; Jerome Fix, Newtown, program chairman; and A. G. Madden, Madeira, public relations.

s/M. J. CAIN, *Secretary*.

Oklahoma

Animal Disease Research Workers.—The annual meeting of the Animal Disease Research Workers in the Southern States was held at Stillwater on March 6-7, 1958.

The following officers were elected: Drs. J. C. Osborne, Raleigh, N. Car., president; L. R. Davis, Auburn, Ala., vice-president; A. L. Kleckner, Athens, Ga., secretary-treasurer.

s/A. L. KLECKNER, *Secretary*.

Pennsylvania

Keystone V.M.A. Meeting.—The regular meeting of the Keystone Veterinary Medical Association was held on March 26 in the School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

Dr. Hugh Simpson, former assistant professor of veterinary surgery at Iowa State College, discussed the most pressing problem of the day—"Distemper and What to Do About It."

An excellent sound film on veterinery uses of Cortisone, the first of its kind, was presented.

s/DRS. LEONARD KRAWITZ AND JOSEPH O'NEIL.

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Bucks-Montgomery V.M.A.—A regular meeting of the Bucks-Montgomery Veterinary Medical Association was held April 9, 1958, at the Moose Lodge, Doylestown.

The speaker was Dr. Quentin F. McDonald of the Schering Corporation, who presented commentary and interpretation of the film "Metisteroids in Veterinary Medicine."

s/M. J. DEUBLER, *Secretary*.

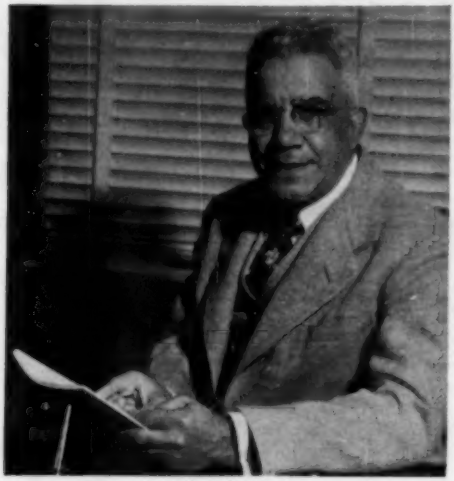
Texas

Dr. Evans Twice Honored.—Dr. Edward B. Evans, president of Prairie View A. & M. College, Prairie View, Texas, the largest Land-Grant college for Negroes in America, was awarded the honorary degree, Doctor of Science, by his alma mater at the Iowa State College centennial celebration at Ames, on March 22, 1958.

Dr. Evans was born in Jackson City, Mo., May 7, 1894. He received his degree in veterinary medicine from Iowa State College in 1918. He enlisted with the Medical Reserve Corps, and after two years of service, was discharged from the army as a second lieutenant. He then joined the faculty at Prairie View A. & M. College, where he established the department of veterinary medicine and supervised the planning of the Veterinary Hospital Clinic, erected in 1924. He served as director of this department for many years.

During his career at Prairie View, Dr. Evans has also served as director of athletics, as acting director of the divisions of Agriculture and Arts and Sciences at varying times, as acting registrar, and as director of the summer school.

He served as vice principal of the college from 1925 to 1946, and as state leader in Negro extension work from 1941 until 1946. In 1945, he was loaned to Tuskegee Institute to plan, organize, and build the School of Veterinary Medicine now in operation at that college. He



Dr. Edward B. Evans

was elected as chief executive of Prairie View A. & M. College in 1946.

Dr. Evans also served as the president and secretary-treasurer of the Southwest Athletic Conference from 1924 to 1942 and as secretary-treasurer of the Coaches and Officials Association of the Southwest.

A few years ago, Dr. Evans was active on an FAO assignment in Africa and remains as consultant to that organization. He has also received the Silver Beaver and Silver Antelope awards from the Boy Scouts of America; a certificate of recognition from the Texas Agricultural and Mechanical College System for 25 years of outstanding service; and the Honorary Modern Farmer Award from the Texas State Association of the New Farmers of America.

Dr. Evans was the first Negro to be elected to Phi Kappa Phi at Iowa State College. He also holds memberships in the Texas Academy of Science, American Legion, Alpha Phi Alpha Fraternity, American Veterinary Medical Association, Texas Veterinary Medical Association, Executive Committee of the American Association of Land-Grant Colleges and State Universities, and the Conference of Negro Land-Grant College Presidents, of which he has served as president.

The Iowa State College veterinary faculty served a luncheon in his honor on March 20.

Dr. Evans was also recently honored on his 40th anniversary with Prairie View A. & M. College. Speakers at the Appreciation Ceremony at Prairie View, Texas, included Dr. M. T. Harrington, president of the A. & M. College System, and Dr. R. D. Turk, president of the Texas Veterinary Medical Association.

Wisconsin

Southeastern Wisconsin Auxiliary.—The annual meeting of the Women's Auxiliary to the Southeastern Wisconsin Veterinary Medical Association met at the Hotel Rogers in Beaver Dam.

The following officers were elected: Mrs. Daniel Paradee, Hustisford, president; Mrs. J. Robert Curtis, Portage, vice-president; Mrs. Alva Kelman, Waterloo, secretary-treasurer.

A brief resumé of the year's program is as follows:

Bookkeeping Methods in Business—discussed by Mr. T. Paulson, a certified public accountant.

In What Ways Can Veterinarians' Wives Help Their Husbands in Their Professional Careers—discussion by group.

Book Review of "Gift of the Sea" by Mrs. C. Westphal.

A Trip to Sweden—pictures and commentary by Dr. Walter M. Johnson

Personality Development—a talk and demonstration by Mrs. Ruby Ayer Style Show.

Hobby of Dolls and Their Costumes by Mrs. O. S. Phelps.

s/(MRS. J. R.) RUTH CURTIS, *Secretary.*

FOREIGN NEWS

Germany

Biennial Meeting.—The regular biennial meeting of the German Veterinary Association will be held in Hannover, Germany, Sept. 19-21, 1958. The theme for the meeting will be "The Veterinarian as Counselor and Friend of the Farmer." Additional information may be obtained from Herr Dr. Karl Ohly, president, German Veterinary Association, 123 Forsthausstrasse, Frankfurt/Main, Germany.

STATE BOARD EXAMINATIONS

Interested persons can obtain information about applications, fees, deadlines for filing applications, and exact time and place of examinations of the respective boards by writing to the persons whose names and addresses are given below.

BRITISH COLUMBIA—June and November, 1958 (usually end of the second week); Vancouver. G. L. Stovell, British Columbia Veterinary Association, 3187 West 43rd Ave., Vancouver 13, secretary.

CALIFORNIA—June 9-11, 1958, School of Veterinary Medicine, University of California, Davis, Calif.

DISTRICT OF COLUMBIA—June 26, 1958, Department of Occupations and Professions, 1740 Massachusetts Ave., N.W., Washington, D.C. A. F. McEwan, secretary, 1740 Massachusetts Ave., N.W., Washington 6, D.C.

FLORIDA—June 16-17-18, 1958, Biscayne Terrace Hotel, Miami. Dr. E. L. Matthews, secretary, Box 141, Palatka, Fla.

INDIANA—July 8-9, 1958, House of Representatives,

State House, Indianapolis, Ind. Joe W. Green, secretary, Room 413, 611 N. Park Ave., Indianapolis 4, Ind.

IOWA—June 16-17, 1958, Office of the Division of Animal Industry, State House, Des Moines, Iowa. A. L. Sandberg, chief, Division of Animal Industry, Des Moines, Iowa.

KANSAS—May 27-29, 1958, Dykstra Veterinary Hospital, Kansas State College, Manhattan, Kan. Applications must be filed by May 1, 1958. Chas. W. Bower, secretary, 1128 Kansas Ave., Topeka, Kan.

KENTUCKY—July 28, 1958. University of Kentucky, Lexington. J. K. Bushnell, secretary, 229 Houston, Paris, Ky.

MAINE—July 7-8, 1958, State House, Augusta, Maine. E. C. Moore, secretary, Turner Center, Maine.

MARYLAND—June 18, 1958, written examination; June 19, 1958, practical examination; College Park, Md. Harold S. Gober, secretary, 5400 Park Heights Ave., Baltimore 15, Md.

MASSACHUSETTS—June 26-27-28, 1958, Amherst. Dr. Edward A. Blake, secretary, Room 33, State House, Boston, Mass.

MICHIGAN—June 9-10, 1958, Lansing, Mich. Written, practical, and oral examinations. Applications must be on file at least 15 days before examination, accompanied by $25 fee. Address: State Veterinarian, 641 Lewis Cass Bldg., Lansing 13, Mich.

MISSISSIPPI—June 17, 1958, Jackson, Miss. Wm. L. Gates, secretary, Box 417, Clarksdale, Miss.

MISSOURI—June 4-5, 1958, Veterinary Clinic, University of Missouri, Columbia, Mo. Dr. L. A. Rosner, chairman, Missouri Veterinary Board, Box 630, Jefferson City, Mo.

MONTANA—June 30-July 2, 1958, Montana State College, Bozeman. J. W. Safford, secretary treasurer, Capitol Station, Helena, Mont.

NEW YORK—June 18, 19, 1958, practical examination, Ithaca; June 24-27, 1958, written examination, New York City, Albany, Syracuse, Buffalo, and Rochester. John W. Paige, chief, Bureau of Examinations and Registrations, 23 S. Pearl St., Albany, N.Y.

NORTH CAROLINA—June 23-25, 1958, Hotel Washington Duke, Durham, N. Car. James I. Cornwell, secretary, 65 Beverly Road, Beverly Hills, Asheville, N. Car.

OHIO—June 10-11, 1958, College of Veterinary Medicine, Ohio State University, Columbus. H. G. Geyer, DVM, secretary, Room 720, Ohio Department Building, 65 S. Front Street, Columbus 15, Ohio.

OKLAHOMA—May 20-22, 1958, College of Veterinary Medicine, Oklahoma State University, Stillwater. Dr. Robert S. Todd, secretary-treasurer, Oklahoma Board of Veterinary Medical Examiners, 310 State Capitol, Oklahoma City, Okla.

ONTARIO—June 9-11, 1958, Ontario Veterinary College, Guelph, Ont., G. A. Edge, secretary, Box 37, Postal Station F, Toronto 5, Ont.

RHODE ISLAND—July 8-9, 1958, 505 Veterans' Memorial Bldg., Providence. R.I. T. J. Grennan, Jr., secretary, Box 31, Ailenton, R. I.

SASKATCHEWAN—June 17, 1958, University of Saskatchewan, Saskatoon, Sask. Fred M. Clark, secretary, 619 9th Ave., Saskatoon, Sask.

SOUTH CAROLINA—June 19-20, 1958 (tentative), Columbia. H. L. Sutherland, secretary, P. O. Box 87, Union, S. Car.

SOUTH DAKOTA—June 23-24, 1958, Veterinary South Dakota State College, Science Department, Brookings. Dr. M. D. Mitchell, secretary, Livestock Sanitary Board, Pierre, S. Dak.

TENNESSEE—June 23-24, 1958, Nashville, Tenn. W. O. Greene, secretary, 4119 Hillsboro Road, Nashville, Tenn.

TEXAS—May 26-28, 1958, Texas A & M College, College Station, Texas. T. D. Weaver, executive secretary, Texas State Board Veterinary Medical Examiners, 207 Capital National Bank Bldg., Austin 16, Texas.

UTAH—June 19-20, 1958, State Capitol Building, Salt Lake City, Utah. Obtain Application from Mr. Frank Lees, State Capitol Bldg., Salt Lake City. Dr. Wayne Binns, Chairman, Utah State Veterinary Board of Examiners, Utah State University, Logan, Utah.

VIRGINIA—June 26, 1958, Capitol Building, Richmond, Va. T. N. Burton, secretary, Department of Professional and Occupational Registration, P. O. Box 1-X, Richmond, Va.

WASHINGTON—May 30-June 1, 1958, Pullman, Wash. Thomas A. Carter, Administrator, Professional Division, State Department of Licenses, Olympia, Wash.

DEATHS

Star indicates member of AVMA

★**Edwin R. Dimock** (KCV '10), 75, Merrow, Conn., former commissioner of domestic animals, state senator, and one-time sheriff of Tolland County, died on Dec. 19, 1957. He was a brother of the late W. W. Dimock, former head of the veterinary science department at the University of Kentucky who served as AVMA president in 1942-1943.

Born at Tolland, Conn., in 1383, Dr. Dimock was a graduate of Connecticut Agricultural College prior to entering Kansas City Veterinary College. He was credited with controlling bovine tuberculosis in his native state which was considered one of the most heavily infected areas until 1936.

He served three terms in the state legislature starting in 1913, was elected sheriff of his county in 1938, and served as postmaster and express agent in Merrow from 1914 to 1924. From 1933 to 1938, he was state commissioner of domestic animals.

Dr. Dimock was also active in the local Men's Club, the Farm Bureau, and Grange, of which he was past-master. He was a Mason and a member of the Shakespeare Club of the University of Connecticut.

He is survived by his widow and two sisters.

★**George Gordon** (CVC '14), 72, Chicago, Ill., died March 3, 1958. Dr. Gordon had operated an animal hospital in Chicago for more than 40 years. He was a member of the Illinois V.M.A. and of the AVMA to which he was admitted in 1915. Dr. Gordon is survived by his widow, a son, a daughter, and two grandchildren.

★**Lester J. Gorman** (ISC '39), 43, Lackland Air Force Base, Texas, died Feb. 10, 1958. Dr. Gorman was commissioned in the Army Veterinary Corps in 1939 and in 1949 transferred to the Air Force Veterinary Service. He was interested in veterinary public health and obtained his M.P.H. degree from the University of Michigan in 1951. At the time of his death he had attained the rank of lieutenant colonel. He was admitted to the AVMA in 1939.

Lieutenant Colonel Gorman is survived by his widow and four children.

PUBLISHED REPORTS OF EXPERIENCE WITH
SURITAL® SODIUM
(thiamylal sodium, Parke-Davis)

Reprint from the JOURNAL of the American Veterinary Medical Association
vol. 124, No. 922, Jan., 1954, pp. 19-20.

A Note on the Use of Surital Sodium Anesthesia in Swine

H. W. DUNNE, D.V.M., Ph.D., and Captain S. C. BENBROOK, V.C., U.S. Army
East Lansing, Michigan

THE NEED for a satisfactory anesthetic in swine practice has long been recognized by veterinary surgeons and research workers throughout the nation. Until recently, most of the anesthetics available seemed to be contraindicated in some phase of application. They proved to be either toxic, resulting in frequent deaths, or the duration of anesthesia was too long and incurred time-consuming alteration following an operation. Floundering and struggling associated with recovery from anesthesia of

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Use of Surital Sodium and Curare in Small-Animal Surgery

W. O. Brinker, D.V.M., M.S.
Michigan State College
East Lansing, Mich.

Reprint, The North American Veterinarian, Vol. 32, December, 1951.

Reprinted from VETERINARY MEDICINE, Vol. XLVII, No. 3, March 1952

Surital Sodium And Morphine Anesth
In Canine Surgery

W. C. YOUNG, JR.,* D.V.M. and F. E. EADS
D.V.M., M.S., Detroit, Michi

THE use of surital** sodium (sodium 5-allyl-5-(1-methylbutyl)-2-thiobarbiturate), a recently developed ultra-short acting thiobarbiturate, has been reported by several workers. It could be called the thiamylal of the "normal" just as pentothal** sodium could be considered the thiopentalone of anesthesia** In most instances, intravenously. Howe Dillon and Dornon' administration in ve this manner has n nary medicine. In five experim

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Surital Sodium Anesthesia in Canine Surgery

H. B. ROBERTS, D.V.M.; W. E. WENDT, D.V.M.; C. C. WAGNER, D.V.M., M.Sc.;
T. F. REUTNER, D.V.M., M.S.

Reprint from the JOURNAL of the American Veterinary Medical Association,
Vol. CXVIII, No. 888, March, 1951, pp. 191-195.

Reprint from the JOURNAL of the American Veterinary Medical Association, vol. 122, No. 912, Mar., 1953.

Dosage Studies of Surital Sodium in Dogs

ROBERT F. BORGMAN D.V.M., M.S.
Asheville, North Carolina

RESULTS, a new thiobarbiturate, surital sodium, has been offered for limited clinical trial. Clinical reports have shown surital sodium to be an excellent anesthetic for operations of short duration in dogs. Its anesthesia is smooth and relatively free from excitement and irritability.[1-3] When injected intravenously at hourly intervals,

RESULTS

A total of 11 dogs were t average dose necessary for 6.3 mg. of surital sodium pe weight. Of the 2 dogs an

TABLE 1—Results of Surital So

Reprinted from VETERINARY MEDICINE, Vol. L, No. 8, p. 345, August 1

Intrathoracic Anesthesia In Cats

MARK STERNFELS, D.V.M., Mount Vernon, New York

WHEN a human patient is suffering from an ailment which calls for surgical intervention, an anesthetic technic is employed to destroy pain sensation. Preoperative injections of blood sugar levels for prevention of shock and dehydration.

The anesthetist is usually part of the surgical

Surgery performed under anesth by intrathoracic administration o cluded: Teeth cleaning and ex trimming and removal of injur abscesses, removal of cysts, pr prostatectomy, castration, cesarea treatments, accident cases, r fracture, and for x-ray diagno

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Surital Sodium, A New Anesthetic and Hypnotic
Studies in Dogs

T. F. REUTNER, D.V.M., M.S., and O. M. GRUHZIT, M.S., M.D.
Detroit, Michigan

Reprint from the Journal of the American Veterinary Medical Association,
Vol. CXIII, No. 880, October, 1948, pp. 282-288.

Surital Sodium Anesthesia in Dogs and Cats
A Symposium Covering 7522 Patients

F. E. EADS, D.V.M., M.S., *Detroit, Mich.*

Although intravenous anesthesia is one of the oldest means of rendering patients insensible to pain, the method has been actively studied only within the past 15 years. So far as is known, the earliest attempt to produce anesthesia by vein was made in 1665 when a solution of opium was given by means of a

covery. They estimate that the approximately 1.5 times that of the dog. Similar results were Kelly, et al.** Surital seems clearly in dogs than does pen theory appears to be less satisfa tonification mechanisms wher

(*Reprinted from* THE CALIFORNIA VETERINARIAN, Sept.-Oct., 1953.

These and other publications on Surital available on request

Department of Veterinary Medicine
PARKE, DAVIS & COMPANY
DETROIT 32, MICHIGAN

MEDICAMENTA VERA

Places to Go . . . . . Places to See in 1958 Convention City

Ninety-Fifth Annual Meeting **Philadelphia—Aug. 18-21, 1958**

Older cities, such as Philadelphia, have taken time to develop traditions, distinct modes of living, and pride in history and the good things of life. Not the least of these good things is food.

The City of Brotherly Love, proud of its historical traditions, is equally proud of its many fine dining establishments and its reputation as the originator of Philadelphia pepperpot, scrapple, ice cream, and many other dishes that today are enjoyed the world over.

Distinctive Dining in Fine Hotels

Bellevue-Stratford features their Stratford Garden Restaurant with luncheon from 11:30 a.m. to 2:30 p.m., dinner 5 to 9 p.m. and dancing 9:30 p.m. to 1 a.m. They also have a coffee shop, Viennese Cocktail Lounge, and Hunt Bar.

Benjamin Franklin is noted for its "Flaming Sword Service" in the Garden Terrace. A continental buffet dinner is featured on Wednesday and Thursday.

Penn-Sherwood specializes in roast beef and jumbo African lobster tails.

Sheraton cuisine is French, served in the manner of Careme, a noted French chef of the nineteenth century. A Chop and Steak House is also part of this hotel's dining establishment.

Sylvania takes pride in its Colonial Philadelphia cooking.

Warwick's Shrimp Lamaze is recommended by gourmets the world over. The Coach Room is set aside for men only, while couples can enjoy cocktails in the Embassy Room.

Special Cuisine

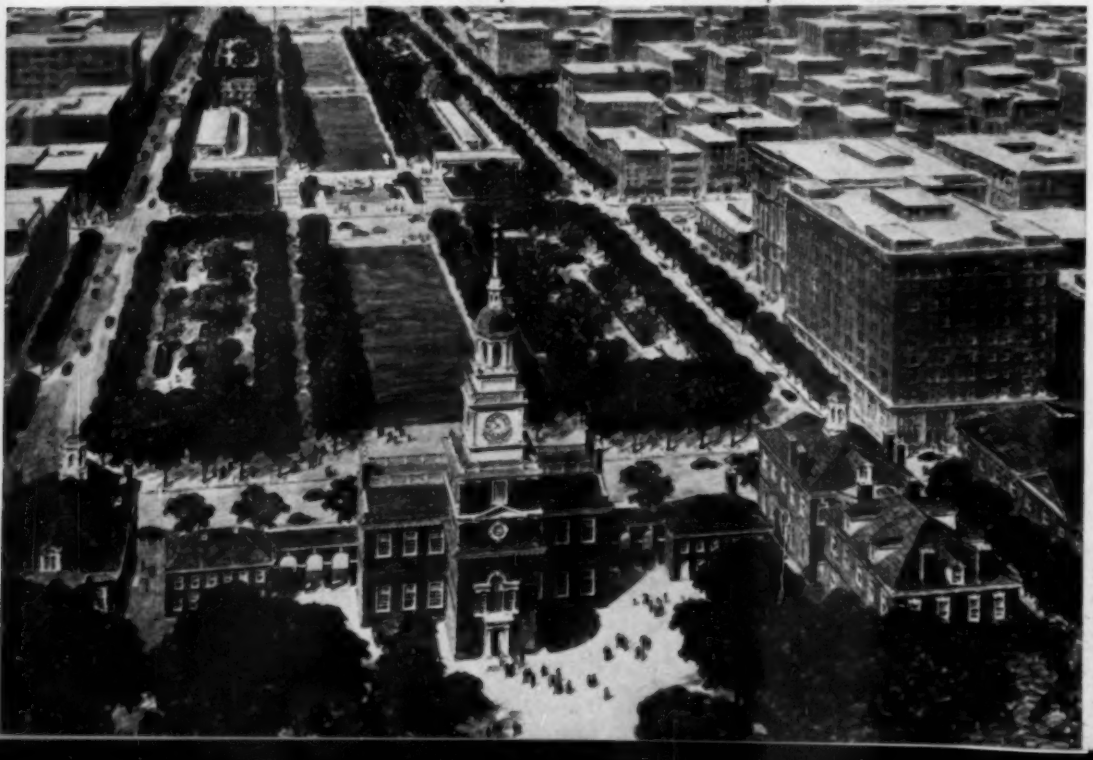
SEA FOOD FAVORITES

Philadelphia is well noted for its sea food dishes. Bookbinders at 125 Walnut St. and Bookbinders (no relation) at 215 South 15th St. cater to sea food enthusiasts, as does Kelly's on Mole St., Kugler's on Chestnut and Venice at 12th and Filbert Sts.

STEAKS AND ROAST BEEF

Steaks in any atmosphere can be found in Philadelphia's many fine steak houses. Arthur's Steak House has a colonial atmosphere, the Lido is Italian, Lew Tendler's surrounds its patrons with notables, Orsatli's Bonfire Room also has Italian cuisine.

An Air View of Independence Hall and the Independence Mall



CHINESE FOODS

Famous for family dinners served in an authentic Chinese atmosphere, the Cathay Tea Garden offers Chinese or American dinners from $1.10 up. Oriental hospitality and Cantonese menu are featured in the China Village.

Places to See

Independence Hall, where the Declaration of Independence and the Constitution of the United States were signed.

Congress Hall, where the government of the U. S. was centered from 1790 to 1800.

Betsy Ross House, controversial "birthplace" of our flag which was adopted by Congress in 1777.

Carpenter's Hall, where the First Continental Congress met the year before the world heard the famous shot at Lexington.

Christ Church, founded in 1695.

Elfreth's Alley, the oldest street in North America.

Washington's Headquarters, at Valley Forge, a short drive from the city.

U. S. Mint, in Philadelphia, is the oldest in the nation.

Franklin Institute and Fels Planetarium are ranked among the world's greatest institutes of scientific marvels.

Zoological Gardens is the oldest zoo in the U. S. and houses 1,800 wild animals.

Museum of Art houses some of the finest, rarest, and most valuable art objects of the world.

Morris Arboretum has the world's most famous collection of Asiatic plants, shrubs, and trees.

Philadelphia Port is the second largest in the U. S.

Philadelphia Naval Base is the dock for many famous warships from World War II, now in "mothballs."

Philadelphia Panorama, housed in the Commercial Museum, shows the dramatic story of Philadelphia past, present, and future.

Hotels and Housing Bureau

Seven hotels, including many of Philadelphia's fine eating places, have been selected to house convention registrants. Information, rates, and reservations form will be found on adv. page 47 of this issue, facing a location map for hotels and other points of interest mentioned above.

The Philadelphia Convention and Visitors Bureau is handling registrations and they advise that early requests will receive the choice space.

"FAMILY PLAN" AVAILABLE

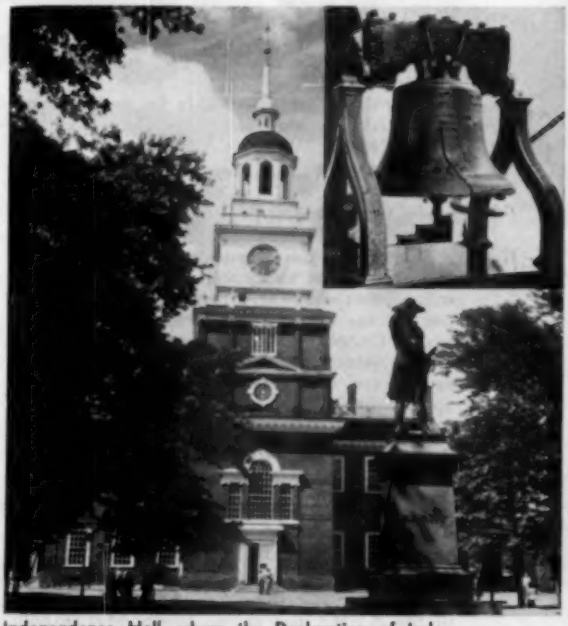
All the hotels listed offer "family plan" rates for children 14 years of age and under. This means that no extra charge will be made for room accommodations for children of that age.

The Sheraton has been selected by the Local Committee as the headquarters hotel. All hotels have air-conditioned rooms.

Elfreth's Alley, the oldest street in the United States, is lined by colonial residences over 200 years old.

Shuttle Bus Service

Shuttle buses will be operated from the downtown area and the hotels to the Convention Hall and will provide convenient, low-cost transportation.



Independence Hall, where the Declaration of Independence was adopted on July 4, 1776. The Liberty Bell (inset) stands in historic glory in the main corridor.

WOMEN'S AUXILIARY

President—Mrs. Leslie H. Moe, 1814 W. Third Ave., Stillwater, Okla.
Secretary—Mrs. A. W. Eivers, 1595 N. 18th, Salem, Ore.

A Short History of the AVMA Women's Auxiliary.—On Aug. 22, 1917, a group of women met for luncheon at the Kansas City Veterinary College, Kansas City, Mo., to organize the Women's Auxiliary to the AVMA. Mrs. A. T. Kinsley, Kansas City, Mo., presided at the business meeting. The following officers were elected: Mrs. W. Horace Hoskins, Philadelphia, president; Mrs. Ashe Lockhart, Kansas City, Mo., corresponding secretary; Mrs. C. E. Cotton, Minneapolis, recording secretary; Mrs. Hans Jenson, Kansas City, Mo., treasurer.

The original purpose of the organization was to aid the families of veterinarians whose welfare had been disrupted by World War I.

The 1920 national meeting marked an important development in the auxiliary history because the present-day auxiliary Loan Fund was founded.

A big step in the structural life of our Auxiliary was in 1930, when a move to encourage the state auxiliaries to become chapters of the AVMA Auxiliary was begun. These form our present-day House of Representatives.

A pamphlet, "What the Veterinary Profession Means to the Public," was sponsored by the AVMA Auxiliary in 1945. Through this pamphlet, the public was greatly enlightened and the membership in the auxiliary was doubled.

In 1946, it became possible for any auxiliary to an AVMA student chapter to become an affiliate of the Women's Auxiliary.

The AVMA Auxiliary annual achievement award of $25, made to the outstanding senior student in each accredited veterinary school, was originated in 1948.

Since 1952, the Women's Auxiliary has encouraged state and local auxiliaries to contribute to the AVMA Research Fund in support of the AVMA Research Fellowship Program. Under this program, carefully selected young veterinarians with an aptitude for research are awarded fellowships to carry out specific projects at approved educational institutions.

In 1953, charter members were automatically made life members.

The Memorial Fund, made up from contributions given in memory of deceased veterinarians or members of their families, and gift legacies, originated in 1954.

In the period from August, 1917, to July, 1957, the membership of the women's auxiliary of the AVMA has shown tremendous growth, increasing from a small group of 55 members to 6,285 active members.

s/Mrs. E. R. Walker.

STUDENT CHAPTER ACTIVITIES

Ontario Student Chapter.—A very enjoyable and informative evening was spent at the Royal Hotel, Guelph, on March 27, 1958, when the students, faculty members, and nearby veterinarians were the guests of Allied Laboratories (Canada) Limited.

The meeting was opened by the president of the chapter, Mr. Michael J. Walcroft, who introduced the guest speaker, Dr. C. E. DeCamp, chairman of the Public Relations Committee of the American Veterinary Medical Association. Dr. DeCamp maintains an active interest in most of the international, national, and many state veterinary associations and frequently takes part in the programs. His topic at this meeting was "Developing a Practice," and he dealt with such phases as finding a location; relations with colleagues; fees and business methods; telephone service; veterinary relationships; community affairs; business contacts.

Following this most interesting talk the meeting was thrown open for discussion, questions being answered by a panel consisting of Dr. DeCamp; Dr. Jean Rumney, Hamilton; Dr. C. R. Buck, Waterloo; and Dr. N. A. Hawkins, Guelph.

The meeting was followed by a social hour sponsored by Allied Laboratories (Canada) Limited.

s/C. C. Cunningham, *Secretary.*

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Additions to the AVMA Film Library

Hidden Menace

16 mm. Sound	Color; Running time 22 min.	Produced by U.S.D.A., ARS	Rental $2.50

This film shows how modern transportation and thoughtless travelers can introduce insects and disease from foreign countries into the U.S. and U.S.D.A. precautions to prevent the entrance of foreign plagues.

Almost the entire first half of the film is concerned with insect threats to crops. The last half pertains more to the dozens of imports and to the livestock industry showing how metal containers can be examined to detect their contents and warns against bringing in meat or animals. Several scenes show quarantined poultry and zoo animals and one scene depicts the slaughter of swine exposed to foot and mouth disease.

This film should be useful in warning nonprofessional audiences of the damage a single contaminated food item can cause to agriculture and the part veterinarians play on the team guarding the nation against foreign diseases. It has been cleared for use on television.

WASHINGTON NEWS—Continued from adv. p. 8

Representative Multer (D., N.Y.) introduced H.R. 11662, a bill to provide for the grading of meat and informing ultimate consumer of such grade. This would apply to meat shipped in interstate and foreign commerce and to meat of cattle, sheep, swine, poultry, and goats.

★ ★ ★

Miscellaneous.—Public Health Service recently established a National Advisory Committee on Radiation to plan epidemiological studies, radiation monitoring of milk, water, and air, and state radiation safety measures. Dr. Russell H. Morgan, Johns Hopkins University, the surgeon general's special consultant on radiation, is chairman.

U.S.D.A., March 28, quarantined part of Wayne Township, Warren Co., and New Jasper Township, Green Co., Ohio, due to scrapie.

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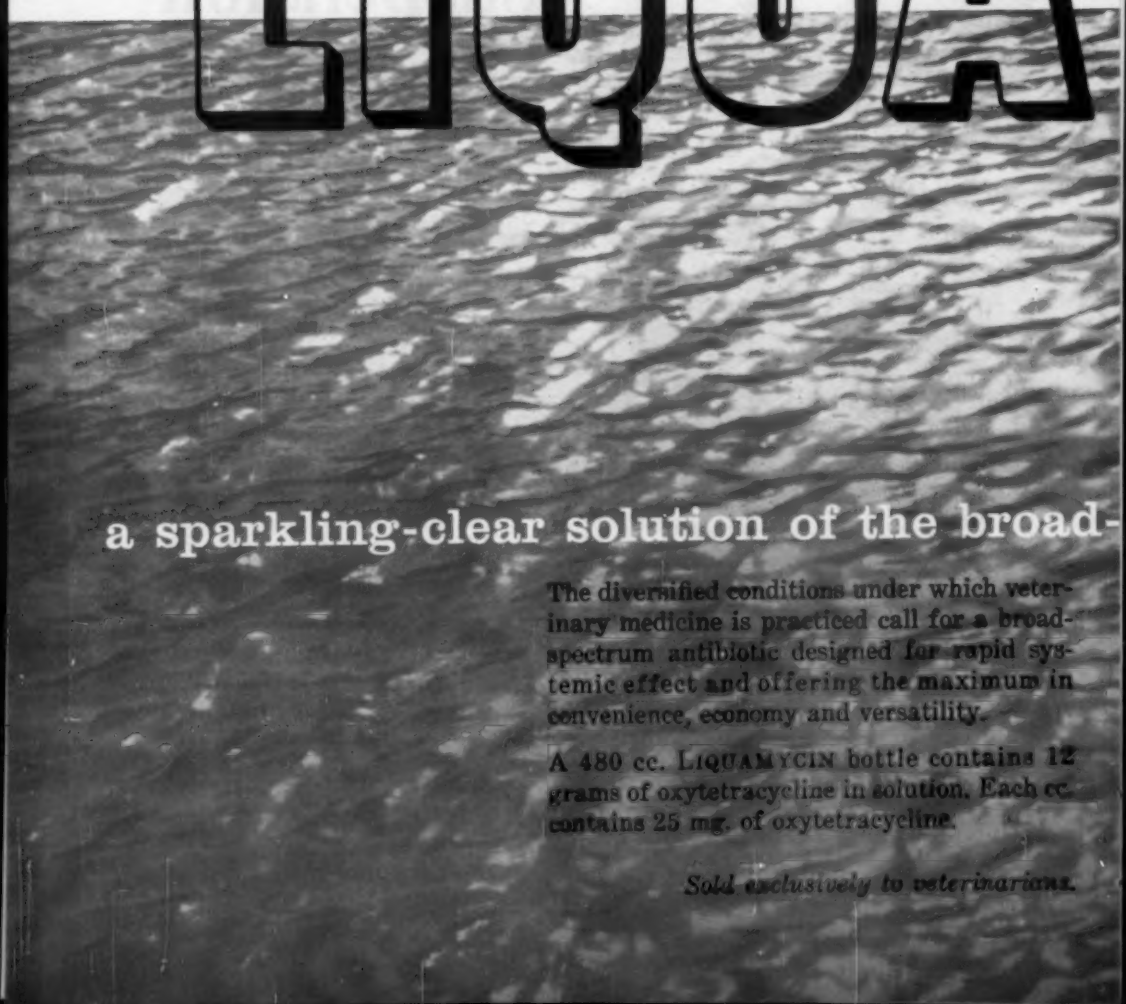

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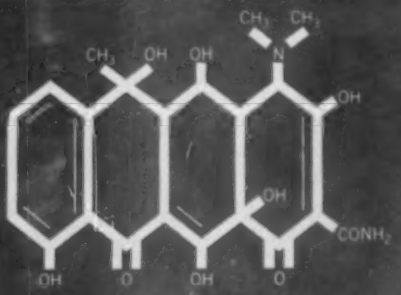

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COMING MEETINGS

Florida Conference for Veterinarians. First annual conference. Health Center Auditorium, University of Florida, Gainesville, May 17-18, 1958. Dr. M. W. Emmel, general conference chairman.

Michigan Veterinary Medical Association. Annual meeting. Grand Hotel, Mackinaw Island, June 2-4, 1958. Charles Coy, Hillsdale, general chairman.

Texas A. & M. College. Eleventh annual Texas conference for veterinarians. School of Veterinary Medicine, Texas A. & M. College, College Station, June 5-6, 1958, R. D. Turk, chairman.

Kansas State College. Annual conference for veterinarians. School of Veterinary Medicine, Kansas State College, Manhattan, June 5-7, 1958. E. E. Leasure, dean.

Montana Veterinary Medical Association. Summer meeting. Florence Hotel, Missoula, June 16-18, 1958. G. A. Morrison, 316 Central Ave., Great Falls, secretary.

Georgia-South Carolina Veterinary Medical Association. Joint Meeting. Bon Air Hotel, Augusta, Ga., June 19-21 1958. A.M. Mills, 325 Pinecrest Drive, Athens, Ga., secretary, program committee.

Idaho and Wyoming Veterinary Medical Association. Joint meeting. Wort Hotel, Jackson Hole, Wyo., June 21-23, 1958. A. P. Schneider, 3025 N. 23rd St., Boise, Idaho, IVMA secretary; J. F. Ryff, P.O. Box 960, Laramie, Wyo., WVMA secretary.

California Veterinary Medical Association. Seventieth annual meeting. Hotel St. Claire, San Jose, June 23-25, 1958. C. H. Ozanian, 10326 Artesia Blvd., Bellflower, program chairman; Chas. S. Travers, 3004 16th St., San Francisco, executive secretary.

Maritime Veterinary Associations. Joint conference. Mount Allison University, Sackville, N.B., June 24-26, 1958. Dr. J. F. Frank, Box 310, Sackville, N.B., chairman.

North Carolina State Veterinary Medical Association. Fifty-seventh annual meeting. The Washington Duke Hotel, Durham, June 24-26, 1958. C. J. Lange, 3741 Hi-Point Rd., Greenboro, secretary-treasurer.

Utah Veterinary Medical Association. Annual meeting. Ogden, June 25-26, 1958. J. A. Thomas, P.O. Box 592, Provo, secretary.

Nebraska State Veterinary Medical Association. Summer meeting. Kearney, Neb., July 18-20, 1958. W. T. Spencer, 1250 N. 37th, Lincoln, secretary.

Alabama Polytechnic Institute. Annual conference for veterinarians. School of Veterinary Medicine, Auburn, July 20-23, 1958. T. C. Fitzgerald, program chairman.

Canadian Veterinary Medical Association. Tenth annual Convention. Royal Alexandra Hotel, Winnipeg, Manitoba. July 21-23, 1958. Claude Kenley, 1195 Wellington St., Ottawa 3, Ont., executive secretary.

Mississippi State Veterinary Medical Association. Fifty-second annual meeting. Buena Vista Hotel, Biloxi, Aug. 10-12, 1958. H. F. McCrory, State College, Miss., secretary.

New York State Veterinary Medical Society. Sixty-seventh annual meeting. Concord Hotel, Kiamesha Lake, N. Y., Sept. 4-6, 1958. Miss Joan S. Halat, 803 Varick St., Utica, N. Y., executive secretary.

Washington State Veterinary Medical Association. Annual meeting, Olympia, Sept. 8-9, 1958, Fred M. Shigley, pro-

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gram chairman. Robert M. Ford, 2406 Boyer Ave., Seattle, executive secretary.

New England Veterinary Medical Association. Annual meeting. Hotel Wentworth, Portsmouth, N. H., Sept. 28-Oct. 1, 1958. C. Lawrence Blakely, 100 Longwood Ave., Boston 15, Mass., secretary-treasurer.

District of Columbia Veterinary Medical Association. Annual all-day meeting. Walter Reed Army Medical Center, Washington, D.C., Oct. 14, 1958. W. I. Gay, 5200 Chandler St., Bethesda, Md., secretary-treasurer.

Eastern Iowa Veterinary Association. Forty-fifth annual meeting. Hotel Roosevelt, Cedar Rapids, Iowa. Oct. 16-17, 1958. F. E. Brunsman, Traer, Iowa, secretary.

Texas Veterinary Medical Association. Annual meeting. Stephen F. Austin Hotel, Austin, Oct. 19-21, 1958. Paul B. Blunt, 710 Maverick Bldg., San Antonio, secretary.

Florida State Veterinary Medical Association. Annual meeting. Galt Ocean Mile Hotel, Fort Lauderdale, Oct. 26-28, 1958. A. R. Chambers, 6116 Main St., Jacksonville, secretary.

Southern Veterinary Medical Association. Annual meeting. Claridge Hotel, Memphis, Tenn., Oct. 26-30, 1958. A. A. Husman, P.O. Box 91, Raleigh, N. Car., secretary.

Oklahoma Veterinary Medical Association. Annual meeting. Mayo Hotel, Tulsa, Jan. 25-27, 1959. M. N. Riemenschneider, 122 State Capitol Bldg., Oklahoma City, secretary.

Foreign Meetings

British Caribbean Veterinary Association. Third veterinary convention. Trinidad, B.W.I., May 25-31, 1958. S. P. Bennett, c/o Dept. of Agric., St. Clair, Port of Spain Trinidad, B.W.I., president.

Sixth International Congresses on Tropical Medicine and Malaria. Lisbon, Portugal, Sept. 5-13, 1958. Professor Manuel R. Pinto, Institute of Tropical Medicine, Lisbon, secretary-general. (Membership application forms may be obtained by U.S. veterinarians by writing to the AVMA.)

German Veterinary Association. Regular biennial meeting. Hannover, Germany, Sept. 19-21, 1958. Dr. Karl Ohly, 123 Forsthausstrasse, Frankfurt/Main, Germany, president.

International Veterinary Congress. Sixteenth session. Madrid, Spain, May 21-27, 1959. Prof. Pedro Carda A., general secretary, Calle Villanueva 11, Madrid.
U.S. COMMITTEE: Dr. W. A. Hagan, chairman, New York State Veterinary College, Ithaca, N. Y.; Dr. J. G. Hardenbergh, secretary, 600 S. Michigan Ave., Chicago 5, Ill.

Third World Congress on Fertility and Sterility. Amsterdam, Holland, June 7-13, 1959. Dr. L. I. Swaab, Sint Agnietenstraat 4, Amsterdam, Holland, honorary secretary.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. Dr. G. W. Jones, Main St., Prattville, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, Decatur, Ala., secretary.

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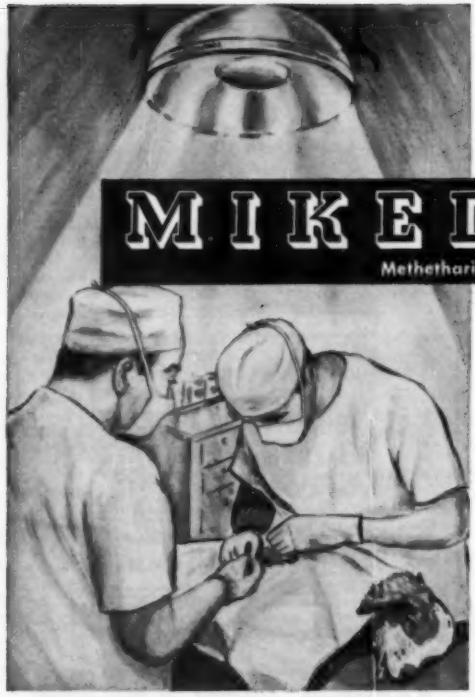

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second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2 Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16 St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. A. L. Irwin, 301 Taft Highway, Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643-N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. R. M. Granfield, 2600 W. El Camino Real, San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert L. Chandler, P.O. Box 8, Ukiah, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Dr. V. H. Austin, 14931 Oxnard St., Van Nuys, secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. Dr. Rolf Reese, 23815 Ventura Blvd., Calabasas, Calif., secretary.

Santa Clara Valley Veterinary Association, the fourth Tuesday of each month. Kay Beulley, N. Fourth and Gish Rd., San Jose, Calif., secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month. D. E. Britten, 544 N. Ben Maddox, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Central Florida Veterinary Medical Association, the first Tuesday of each month, time and place specified monthly. Jack H. McElyea, 5925 Edgewater Drive, Orlando, Fla., secretary.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse

Dr. Saunders Joins Smith, Kline & French

Dr. Leon Z. Saunders, former veterinary pathologist for the Brookhaven National Laboratory, Long Island, N. Y., has joined Smith, Kline & French Laboratories, Philadelphia, as supervisor of their newly created pathology and toxicology section.

The section will centralize research on the effect of new agents at the cellular level in laboratory animals.

Dr. Saunders, a graduate of the Ontario Veterinary College, is a member of the American College of Veterinary Pathologists. He has had numerous articles published on animal neuropathology and eye pathology. He received his doctorate from Cornell University.

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Inn, St. Petersburg. William F. Casler, 2540 30th Ave., N., St. Petersburg, secretary-treasurer.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodsons Restaurant. P. S. Roy, 4443 Atlantic Blvd., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. T. R. Geci, 108B Catherine Ave., Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. J. J. McCarthy, 500-25th Street, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Frank Mueller, Jr., 4148 E. 8th Ave., Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. W. B. Martin, Jr., 3002 N. W. 6th St., Gainesville, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Donald C. Ford, Forest Park, secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. Alfred G. Schiller, Veterinary Clinic, University of Illinois, Urbana, secretary-treasurer.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P. O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month, except June, July, and August,

Dr. Davenport Made Director of Armour Veterinary Department

Dr. Mark E. Davenport, who has been with the Armour Veterinary Laboratories since 1951, has been promoted to director of the veterinary technical department at Kankakee, Ill. Dr. Davenport is a graduate of Purdue University; he received his D.V.M. degree from Ohio State University.

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at 6:30 p.m., Breeze House, Ankeny, Iowa. John Herrick, Ames, secretary.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Association, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. Dr. J. G. Irwin, Iowa City, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Winneshiek Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer, Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. Richard Baum, Osage, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Versailles Rd., Frankford, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. W. E. Bewley, P.O. Box "H," Crestwood, secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Norman Herbert, 3506 Joann Drive, Baltimore 7, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 3034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Chester R. Pegge, 4249 Peck St., St. Louis 7, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Frank A. O'Donnell, Parksville, Mo., secretary-treasurer.

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281 University Ave., Champaign, Ill.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. Burritt Lupton, 569 Franklin Ave., Wyckoff, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. R. Muller, 43 Church St., Lambertville, N. J., secretary.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. R. M. Sauer, secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, third Wednesday of each month, Fez Club, Albuquerque, N.M. Jack Ambrose, 3018 N. Rio Grande Blvd., Albuquerque, secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

New York State Veterinary College, Annual conference for veterinarians. Cornell University, Ithaca. W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N. Y., dean.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

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NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. Joseph A. Lombardo, 411 Woodlawn Ave., Greensboro, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly, Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. T. L. James, Box 243, Newton, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Ashville, N. Car. Vilu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April, and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. D. J. Kern, Killbuck, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the third Tuesday of each month, at 9:00 p. m., Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Forest H. Stockton, 2716 S.W. 29th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m., Ireland's Restaurant, Lloyds', 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinarian Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Marvin M. Corff, McMinnville, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania, School of Veterinary Medicine. Raymond C. Snyder, N. E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

Dr. Gregory Joins Eli Lilly and Company

Dr. Richard P. Gregory, Jr., has joined Eli Lilly and Company as station veterinarian in the agricultural division.

According to J. F. Downing, Ph.D., director of the company's agricultural research, Dr. Gregory was added to the staff to care for the increasing use of poultry and livestock in experiments by the Lilly Agricultural Research Center, Greenfield, Ind.

Richard P. Gregory, Jr.

Dr. Gregory (OSU '49) previously was engaged in practice at Taylorsville, Ky., and Harrisburg, Ill. He is a member of Sigma Xi, Omega Tau Sigma, and the AVMA.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary Ct., Richmond 20, Va., secretary.

Northern Virginia Veterinary Conference, the second Tuesday of each month. Francis E. Mullen, 1130 S. Main St., Harrisonburg, Va., secretary-treasurer.

Northern Virginia Veterinary Society, the Second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle, Wash. William S. Green, 9637 S. E. 36th, Mercer Island, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. O. I. Bailey, P. O. Box 906, Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). R. J. O'Hern, P.O. Box 617, Cumberland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. W. E. Lyle, P. O. Box 107, Deerfield, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. E. S. Scobell, Rt. 2, Wausau, Wis., secretary.

Lye for Rubber Parts of Milking Machines.—The most effective means of preserving rubber liners and hoses of milking machines is by having two sets to use in alternate weeks so that one can be stored continuously in a 5 per cent lye solution for seven days. This extracts the fat absorbed during milking, destroys bacteria in the pores, causes the rubber to retain its shape and tension, prevents odors, and extends the life of the rubber parts.—*Hoard's Dairyman (March 25, 1958): 297.*

CLASSIFIED ADVERTISEMENTS

PERSONAL WANT ADS—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

COMMERCIAL WANT ADS—$5.00 for the first 25 words, 25 cents for each additional word; $1.00 for use of box number.

THE TOTAL WORD COUNT must include complete box number address or personal address line.

Remittance must accompany ad.

DEADLINES

1st of month issue — 8th of month preceding date of issue.

15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

June or recent graduate wanted as assistant veterinarian in small animal practice in Chicago. Address "Box H 27," c/o JOURNAL of the AVMA.

Midwestern Missouri town of 1,400, with large rural trading area, desires a resident veterinarian. Large and small animal practice can be developed. Write: Secretary, Glasgow Chamber of Commerce, Glasgow, Mo.

Wanted—Positions

Experienced veterinarian (UP '55), M.S. (Parasitology), completing service in July, desires position in progressive small animal practice leading to partnership or ownership. Virginia, Pennsylvania, New Jersey licenses; will consider other states pending state board examinations. Address "Box H 7," c/o JOURNAL of the AVMA.

Going to South America. In position to survey markets for veterinary supplies or interpret for traveling agent. Address "Box H 13," c/o JOURNAL of the AVMA.

Graduate (ISC '56) desires position in small animal practice in Middlewest. Licensed Iowa, Illinois. Military obligation completed in August. Address "Box H 2," c/o JOURNAL of the AVMA.

June graduate (OSU '58) desires assistantship in progressive small animal practice, Arizona or California. Married; age 26; dependable. References, picture, interview as requested. Address "Box H 17," c/o JOURNAL of the AVMA.

Graduate desires responsible position educational, commercial, governmental laboratory, or teaching; with research, time permitting. Training at my expense as agreed. Valuable background other fields. Available immediately. Address "Box H 19," c/o JOURNAL of the AVMA.

(Classified ads continued on adv. p. 48)

new specific treatment for calf scours

Developed specifically for the control of calf scours, new ENTEFUR provides rapid, effective and safe treatment. ENTEFUR drastically cuts mortality.[1,2] In one study, 60 of 63 ENTEFUR-treated calves survived, whereas in the control group only 3 of 24 calves lived.[2] "ENTEFUR treatment appeared the only factor modifying significantly the course and outcome of the disease."[2]

ENTEFUR contains the new nitrofuran, Furamazone* (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., in press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., in press.

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NOW AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

EATON LABORATORIES, NORWICH, NEW YORK

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below—then turn the page ▶

Figure 1

History.—An unspayed English Setter, 8 years old, was examined because of recent "coughing and vomiting." Several mammary tumors were present and the owner reported that "six months ago one of the tumors burst and drained." Subsequently, the area healed but later became enlarged. The bitch had been in estrus a month previously but did not attract males. A radiograph was made of the thorax.

Here Is the Diagnosis

(*Continued from preceding page*)

Diagnosis.—Discrete, multiple nodules in the thoracic cavity, probably metastatic tumor nodules in the lungs and mediastinal tissues, as the result of metastases from multiple adenocarcinomatosis of the mammary glands.

Comment.—The numerous well-defined solid masses in the thorax suggest metastases, especially in view of the existing mammary tumors. Adenocarcinoma does not always produce this type of lesion; sometimes there is a "snowstorm" of nodules, at other times, as in this instance, just a few are seen.

The radiograph (fig. 1) is a lateral view of the thorax, showing large discrete multiple nodules in the thoracic cavity.

This case report was submitted by the staff of the Angell Memorial Animal Hospital, Boston, Mass.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Sequelae of Lightning Stroke

Since there is more presumption than knowledge regarding the sequelae of lightning stroke in animals, we present the following new findings from a survey *(Brit. Med. J.,* Nov. 16, 1957: 1152) of human victims, made about two years after the race track incident discussed in the JOURNAL (Sept. 1, 1956: 243).

The second survey revealed that of the 28 victims who replied, the following percentages still suffered from the stated after effects of the lightning stroke: headaches (11% vs. 34% in the first survey); paresthesia (11% vs. 31%); and "hysterical state" (11% vs. 19%).

Deafness continued in one of the three persons thus affected at first. A boy who at first suffered acute pain and photophobia in both eyes, now had a cataract and macular changes due to edema in one eye.

A man of 65, who had been knocked unconscious, had developed an intensification of headache of a migrainous type; a woman of 46, who had suffered previous injuries, had developed an hysterical ataxia, but eventually recovered so she could resume her nursing duties. Two persons reported noticeable improvement in rheumatic conditions following the stroke. A man of 63 who had suffered giddiness and paresthesia in the arm, had a "numbness of the fingers" and dizziness and had been unable to work. One woman was unable to watch television because she seemed to feel vibrations of electricity.

Some of these sequelae might be classed as "psychiatric symptoms" in man but doubtless some of them are due to organic changes which might be similarly suffered by dumb animals. It is suggested (p. 1168) that the nervous system bears the brunt of the current and that the damage may be due to heat, to electrolysis-producing gases in the nervous tissues, or that waves of compressed air may have injurious mechanical effects.

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Anti-inflammatory activity[1] . . . No depression of antibody response . . . Growth stimulating properties[2] . . . Promotion of hemaglobin formation[3] . . . Protection of vitamin potency in the ration[4] . . . Stability[5] and palatability[6] . . . Start getting *full therapeutic value* from your iodide therapy with Paladide. Order from your Jen-Sal Branch or representative today.

1. Vet. Med., 52:601-605
2. Brit. J. Nutr., 11:70-79
3. Biochem. & Physiol. Nutr., 2:439-440
4. Armour Research Foundation Report, Project No. C616
5. Ibid.
6. J. Dairy Sci., 40 (9):1087-1092

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SPARINE produces quiescence *dependably* and *safely* in any situation where animals—large or small—become excited, nervous, or unruly. It calms and relaxes without stupefaction, reduces struggle and the risk of injury to either animal or veterinarian.

Clinically, SPARINE simplifies diagnosis and treatment. In X-ray and otoscopic procedures, in surgery, dentistry and handling, SPARINE *causes* an animal to be calm and manageable.

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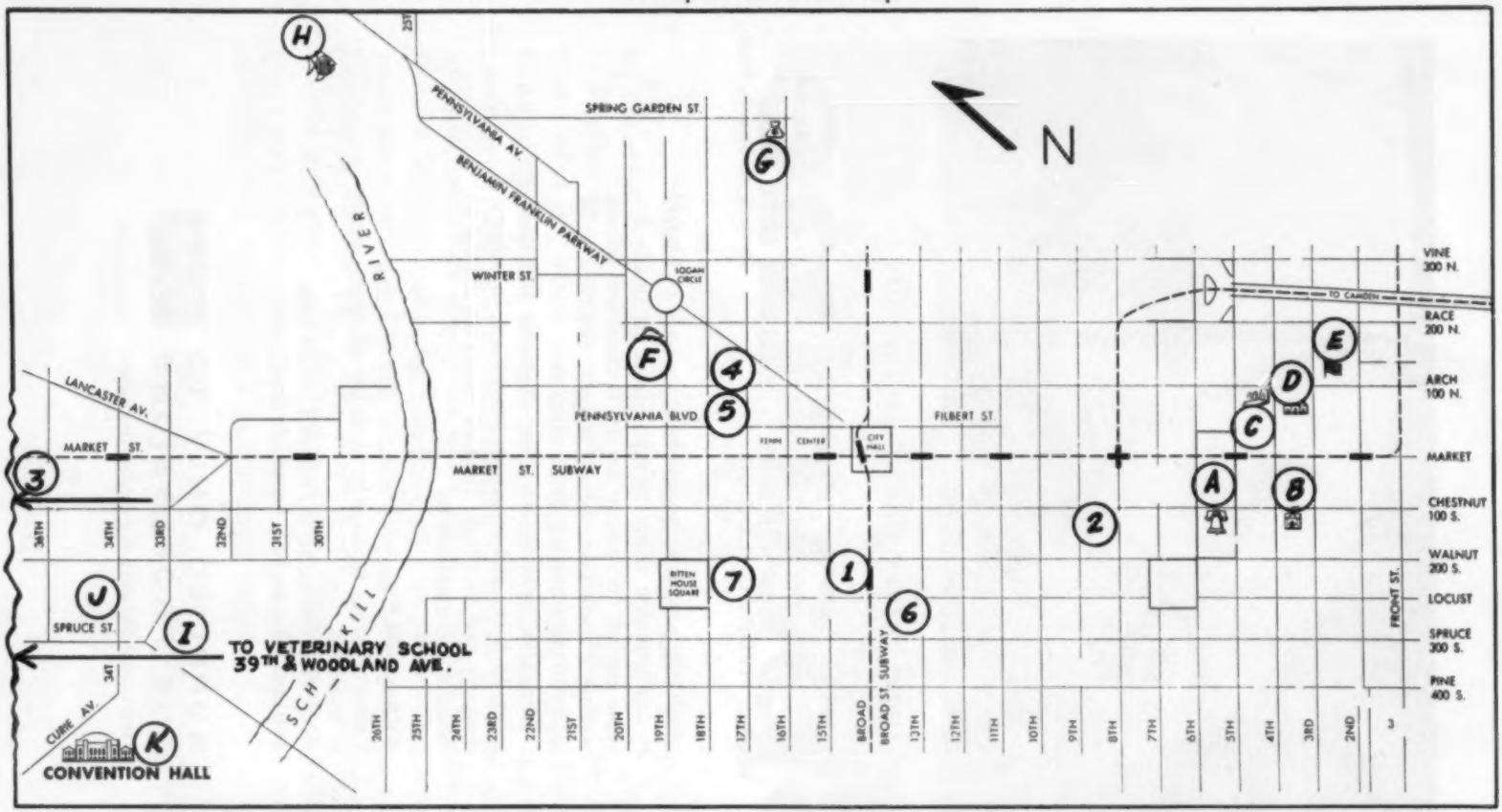
Philadelphia Location Map



1. Bellevue-Stratford Hotel
2. Benjamin Franklin Hotel
3. Penn-Sherwood
4. Robert Morris (not pictured)
5. Sheraton Hotel
6. Sylvania Hotel
7. Warwick Hotel

A. Independence Hall
B. Carpenters' Hall
C. Franklin's Grave
D. Friends' Meeting House
E. Betsy Ross House
F. Academy of Natural Sciences
G. U.S. Mint (Guided Tours)
H. Aquarium
I. University Museum
J. University of Pennsylvania
K. Convention Hall

HOTEL RESERVATIONS — PHILADELPHIA CONVENTION

Ninety-Fifth Annual AVMA Meeting, Aug. 18-21, 1958

All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

Hotels and Rate Schedule

Hotel	Single	Double	Twin	Suite
1. Bellevue-Stratford †	$ 9.00-11.00	$12.00-16.00	$12.00-17.00	$30.00-50.00*
2. Benjamin-Franklin †	9.00-11.00	12.00-15.00	16.00-18.00	.....
3. Penn Sherwood †	6.00- 7.50	11.00	13.50-14.00	15.50*
4. Robert Morris †	6.00	9.50	11.00	.....
5. Sheraton †	9.85-13.50	13.00	15.00-17.00	30.50-41.00*
6. Sylvania ††	7.50- 9.50	.....	10.00-13.00	25.00-27.50*
7. Warwick †	10.00-12.00	.....	15.00-18.00	30.00-35.00*

† Air-Conditioned
†† Partly Air-Conditioned
* 2-room suite

FAMILY PLAN — The 7 hotels listed above offer a "Family Plan" whereby children under 14 years of age receive accommodations free of charge. For more detailed information, contact the Housing Bureau.

Tear Off

RESERVATION FORM — AVMA CONVENTION — PHILADELPHIA

To: Housing Bureau, Philadelphia Convention and Visitors Bureau, Inc., Penn Square Building, Juniper & Filbert Sts., Philadelphia, Pa.

Hotel	Accommodations
(Three choices MUST be shown)	_____Single Room(s) @ $_____
First choice hotel _____	_____Double Room(s) @ $_____
Second choice hotel _____	_____Twin-bed Room(s) @ $_____
Third choice hotel _____	_____2-Room Suite @ $_____

Arriving on (Date) _____ at _____ ( ) a.m. ( ) p.m.

Departing on (Date) _____

Will be occupied by (attach list of additional names if necessary).

Your Name (print or type) _____

Street Address _____

City _____ Zone _____ State or Province _____

(Continued from adv. p. 39)

Wanted—Practices

Veterinarian, early thirties, approved school, nine years' experience in general and exclusive small animal practice. Veteran. Wishes to purchase or lease with option small animal or mixed practice in city area. Consider partnership also. Address P.O. Box 1106, Evanston, Ill.

For Sale or Lease—Practices

Established practice for sale in Indiana. Modern home on highway, with 14 acres. Office, drugs, and instruments—all ready to step in and take over. Large and lucrative territory for veterinarian. Reason for selling: husband's death. Mrs. Clyde Page, Carlisle, Ind.

Modern small animal hospital and four bedroom home for sale; established 30 years, excellent practice, Philadelphia. Will require substantial cash. Address "Box H 20," c/o JOURNAL of the AVMA.

Mixed practice, north central Wisconsin, 90% dairy; health necessitates sale. Real estate, drugs, and equipment. Real estate has income potential. Terms available. Address "Box G 22," c/o JOURNAL of the AVMA.

Established small animal hospital for sale; fully equipped, x-ray, outdoor runs, landscaped 8-room colonial home. Main thoroughfare, New York State. Large animal potential. $15,000 to handle. Address "Box G 3," c/o JOURNAL of the AVMA.

Modern small animal hospital, fully equipped, member of A.A.H.A., with large animal facilities and pasture. Grossing over $48,000 a year. Excellent Southeast location. Other interest reason for sale. Address "Box H 25," c/o JOURNAL of the AVMA.

One of the best and longest established general practices of small, large animal, and poultry. Small animal hospital, well-equipped, 26' x 30', and modern 8-room residence in northern Ohio. Surgical equipment and drugs for small and large animals for immediate sale and possession—due to sickness. $22,000 cash and balance $16,000 on terms to satisfy purchaser. Address "Box H 28," c/o JOURNAL of the AVMA.

For sale or lease one year—long-established practice. Hospital and residence on the same unit. Owner needs a vacation. Address "Box H 26," c/o JOURNAL of the AVMA.

Mixed practice, 85% dairy, on Oregon coast, Tillamook County. Large four-bedroom home, basement clinic with street entrance. Asking $25,000. Includes drugs, equipment, some furniture. Address "Box H 29," c/o JOURNAL of the AVMA.

To insure prompt delivery, replies should be carefully addressed: Complete box number as given in the ad, AVMA, 600 S. Michigan Blvd., Chicago 5, Ill.

Miscellaneous

Pregnancy diagnosis in mares—45th to 150th day. Request mailing tubes; $7.00, 2 or more, $6.00 each. Pregnancy Diagnostic Laboratories, Dysart, Iowa.

Prompt, accurate determination of fungus diseases. Mail in hair, scales, and nail specimens. $5.00 each. The Fungus Diagnostic Services, 7 Watchung Ave., Plainfield, N.J.

Cattle City Fetal Extractors, seconds, 25% off retail, guaranteed one year, very limited number; tools have imperfections in plating and casting. Sold on 30 day free trial basis. Bee & Vee Mfg. Co., Lake City, Iowa.

Too Late to Classify

D.V.M., 1955, desires lease, purchase, or position leading to partnership in small animal practice. Presently in small animal practice. Address "Box H 30," c/o JOURNAL of the AVMA.

D.V.M., 1956, completing military obligation in July, desires position in mixed dairy practice. New York license. Address "Box H 31," c/o JOURNAL of the AVMA.

Graduate veterinarian wanted, Iowa license, for partnership in established practice, large animals, modern equipment. $10,000 capital required; list bank credit reference. Leads to ownership in two years. Address "Box H 32," c/o JOURNAL of the AVMA.

Veterinarian wanted in large animal practice. Assistant leading to partnership. Central Iowa. Address "Box H 33," c/o JOURNAL of the AVMA.

Veterinarian wanted for mixed practice, 70% small and 30% large animal, in upper Middlewest state. Modern office and clinic, completely equipped. Reply stating age, school, experience, martial status, availability, and salary expected. Address "Box H 34," c/o JOURNAL of the AVMA.

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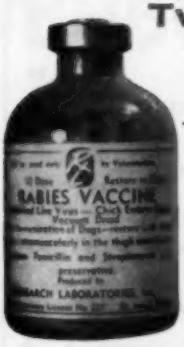

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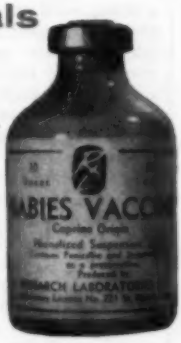

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Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the JOURNAL of the American Veterinary Medical Association with a minimum of reduction. Photomicrographs which can not be reduced should be marked for cropping to 1-column or 2-column width. Identifying marks within the photomicrographs, such as arrows, letters, or numbers, should be clearly marked with black India ink or white opaque ink to insure good contrast for reproduction and must be large enough to stand reduction, if necessary.

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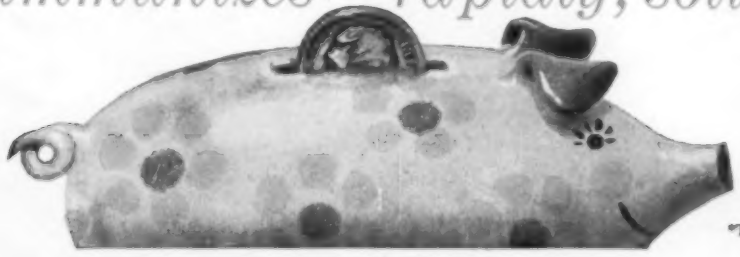

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